Review of State of Knowledge regarding the Safety, Access and Usability Needs of Children with Disabilities

ANEC R&T Project 2006
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Ergonomics & Safety Research Institute
Loughborough University

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Management Summary

Introduction

A study was performed to investigate the existence of standards, guidelines and knowledge on the design or adaptation of everyday facilities and services to support the needs of children with disabilities. The study looked at different environments including public buildings, private dwellings, schools and teaching services, playgrounds, sanitation facilities, public transport, and health and welfare services. It also covered the avoidance of accidents and safety of disabled children.

Methods

The methods used to gather data were: (1) study existing literature, (2) conduct an email survey of disability specialists, and (3) conduct telephone and face-to-face interviews with representatives from national governments, the European Union, special interest groups, architects and academics across Europe. It also looked at particular countries as case study examples including the UK, Ireland, Sweden, Greece, Slovakia and Slovenia.

Results

In terms of general **agreements and legislation** the rights of children to protection from harm, abuse and exploitation, and to participate fully in family, cultural and social life, was well established within the United Nations Convention of the Rights of the Child in 1990[1]. The European Union has an action plan to help with disabilities while the EU High Level Group on Disability monitors national policies and priorities concerning people with disabilities and pools information and experience. Legislation has been passed in many European countries to establish the rights of disabled people and of children in general, but not specifically children with disabilities.

For **public buildings and private dwellings**, the ISO 21542 standard "Building construction — accessibility and usability of the built environment"[2] is a potentially key document in its early stages of development. However like similar documents on building design for disabled people such as the British Standard BS 8300: 2001[3] and Document M of the UK Building Regulations[4], they do not really consider the needs of disabled children in terms of say, heights of handrails (possibly having a lower rail for children), door weights, and toilet facilities. However in Sweden, a relevant publication from the Swedish Handicap Institute[5] is concerned with the adaptation of dwellings for children with reduced mobility. Outside of Europe, Part 3 of the

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[1] United Nations Children's Fund (1990), Convention on the Rights of the Child, Headquarters, United States Fund for UNICEF, East 38th Street, (Mail Code: GC-6), New York, New York 10016. http://www.unicef.org/crc/

[2] International Organization for Standardization (2006) ISO/TC 59/SC 16/WG 1, Draft Proposal 2nd version ISO/CD 21542, Building construction — accessibility and usability of the built environment, Secritariat: AENOR, International Organization for Standardization (ISO), 1, rue de Varembé, Case postale 56, CH-1211 Geneva 20, Switzerland.

[3] British Standards Institution (2001) BS 8300: 2001 Design of buildings and their approaches to meet the needs of disabled people—Code of Practice. British Standards Institution, 389 Chiswick High Road, London W4 4AL, United Kingdom.

[4] Building Regulations (2004) The Building Regulations 2000, Approved document M: Access to and use of buildings, 2004 edition, National Building Specification (NBS) for the Office of the Deputy Prime Minister (now Department for Communities and Local Government, DCLG) http://www.thenbs.com/BuildingRegs/ and http://www.ribabookshops.com/site/viewtitle.asp?sid=&pid=4374

[5] Swedish Handicap Institute (1990) Bo bra med rörelsehindrat barn. Förslag till bostadsanpassning (adaptation of dwellings for children with reduced mobility) www.hi.se.

Australian standard AS1428, covering the design of public and commercial buildings for access by disabled persons, specifies requirements for children and adolescents with physical disabilities[6].

Although a few years old, both the Swedish guidelines and Australian standard would represent a good input to current standards work.

Regarding **sanitary facilities**, the Friendly Rest Room project[7] which was supported by the EU aimed to develop a user-friendly rest room for elderly people and people with limited abilities, using sociological, ergonomic and anthropometric studies and technical developments. Further research in the UK[8] tried to illustrate that an inclusive design approach within the toilet facility will benefit not only people with disabilities but also older people, and parents with young children, etc. However neither study specifically included the needs of children with disabilities. The British Standard BS 6465 on sanitary installations[9] addresses the needs of children and disabled adults well, but it also does not specifically address the needs of children with disabilities. A fact sheet produced by the 'Better toilets for pupils' campaign (http://www.bog-standard.org/factsheet_019.aspx) specifies relevant building regulations that can help pupils with disabilities and special needs.

Several papers were located which highlighted problems concerning access to **health and welfare** services for children with disabilities[10]. In the UK, the Children's National Service Framework (NSF), published in September 2004, sets standards for children's health and social services. Standard 8 of the NSF[11] concentrates on the needs of disabled children and those with complex health needs. As an example of good design practice, the Evelina Children's Hospital at St Thomas' Hospital in London, opened in 2006, has broken with the traditional layout of long corridors and bland wards, and created a flexible workplace to meet the need for both efficient operations and social interaction and a cheerful and colourful ambience, creating the positive environment for the treatment of children. The innovative design won an award from the Royal Institute of British Architects (RIBA) (www.fxmagazine.co.uk/story.asp?storycode=961).

One of the most developed sectors for children with disabilities seem to be those areas which specifically concern children i.e. **educational facilities and services** and playgrounds and play areas. In the UK, legislation such as SENDA (UK Special Educational Needs and Disabilities Act of 2001)[12] and in Ireland, the Education for

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[6] Standards Australia (1992) AS 1428.3: 1992, Design for access and mobility - part 3: Requirements for children and adolescents with physical disabilities, Committee ME-064, Standards Australia, GPO Box 542, Sydney, NSW 2001, Australia.

[7] de Bruin, R. and Molenbroek, J. (2003) On the Development of a Friendly Restroom, Include 2003, London: Royal College of Art.

[8] Bichard, J., Hanson, J. and Greed, C. (2006) Away from Home (Public) Toilet Design: Identifying User Wants, Needs and Aspirations, in Designing Accessible Technology, J. Clarkson, P. Langdon and P. Robinson (eds), Proceedings of CWUAAT 2006. London: Springer-Verlag.

[9] British Standards Institution (1996, 2006) BS 6465-parts 1, 2 and 3: Sanitary installations, British Standards Institution, 389 Chiswick High Road, London W4 4AL, United Kingdom.

[10] Warfield, M. E. and Gulley, S. (2006) Unmet need and problems accessing specialty medical and related services among children with special health care needs. Maternal And Child Health Journal, 10, 2, 201-216, Springer/plenum Publishers New York.

[11] National Health Service (2004) National Service Framework, Section 8, 15 September 2004, http://www.dh.gov.uk/PolicyAndGuidance/HealthAndSocialCareTopics/ChildrenServices/ChildrenServicesInformation/fs/en

[12] Beresford, B. and Oldman, C. (2002) Housing matters: National evidence relating to disabled children and their housing. York: Joseph Rowntree Foundation, www.jrf.org.uk. November 2002.

People with Special Educational Needs (EPSEN) Act 2004, both aim to remove barriers to education for children with disabilities. Key to achieving this is to provide the appropriate resources to support the change, including the training of special needs co-ordinators (SENCOs), establishing Individual Education Plans (IEPs) for children with special needs and to highlight case studies of good practice within local areas that others can follow.

In terms of facilities there is, within European countries, an increasing acceptance that mainstream schools should be made accessible to children with disabilities. The Department for Education and Skills (DfES) in the UK for example, has produced a guidance document[13] to help schools and LEAs with the planning process to progressively improve the accessibility of schools to disabled pupils. There are also several Building Bulletins published by the DfES which cover the design of the environment for pupils with special educational needs and disabilities. These documents cover (1) general design for pupils with special educational needs and disabilities in schools[14], access for disabled people to school buildings[15], acoustic design of schools covering children with hearing impairments[16] and accommodating pupils with special needs and disabilities in mainstream schools[17].

The right to play is recognised as a human right in the UN convention on the Rights of the Child and there is a growing recognition that **playgrounds and play areas** should be safer and more inclusive for children of different abilities. The Working Group CEN/TC 136 SC1 'Playground equipment for children' is currently considering a new German Work Item concerning barrier-free playground equipment, to be dealt with as a separate part of EN 1176, the European standard for playground equipment[18]. It covers safety requirements, materials, design, structural integrity, accessibility, equipment requirements, testing and information for the manufacturer. At the same time in the UK, comprehensive guidelines have been produced by the National Playing Fields Association (NPFA)[19] and by the Office of the Deputy Prime Minister[20] to assist playground managers in meeting the needs of the UK Disability

ISSN: 1-86134-483-X. Available from Marston Books, Abingdon, Oxon, email: direct.orders@marston.co.uk.

[13] Department for Education and Skills (2002) Accessible schools: Planning to increase access to schools for disabled pupils, The Schools and Disability Access Team, Department for Education and Skills, Sanctuary Buildings, Great Smith Street, London, SW1P 3BT. 14 January 2002. Available from: http://www.teachernet.gov.uk/_doc/2220/Access_Guide_.doc.

[14] Building Bulletin 77 (2005) Designing for pupils with special educational needs and disabilities in schools, Department for Education and Skills, http://www.dfes.gov.uk/consultations/conResults.cfm?consultationId=1335

[15] Building Bulletin 91 (1999) Designing for pupils with special educational needs and disabilities in schools, Department for Education and Skills, ISBN 0 11271 062X.

[16] Building Bulletin 93 (2003) Acoustic design of schools, Department for Education and Skills, London: The Stationery Office, ISBN 011 271105 7. http://www.teachernet.gov.uk/management/resourcesfinanceandbuilding/schoolbuildings/desi gnguidance/sbenvironmentalhs/acoustics/ and http://www.soundresearch.co.uk/Building%20Bulletin%2093%20-%20Schools.pdf

[17] Building Bulletin 94 (2001) Designing for pupils with special educational needs and disabilities in schools, Department for Education and Skills. ISBN 0 11271 109X.

[18] CEN/TC 136 SC1 (2005) Barrier-free playground equipment – Safety requirements and test methods, European Standard Work Item, Prepared by the Technical Committee AA14.7." Barrier-free playground equipment", of the Standard Committee "Sports, playground and other recreational equipment" within the DIN German Standards Organisation.

[19] John, A. and Wheway, R. (2004) Can play will play, The National Playing Fields Association (NPFA), St. Chad's Place, London WC1X 9HH http://www.npfa.co.uk/content/playforchildren/index.html

[20] Office of the Deputy Prime Minister (2003) Developing accessible play space, Office of the Deputy Prime Minister (ODPM). Product code: 03UPU01737. Available from ODPM Publications,

Discrimination Act (DDA) 1995. In Sweden, similar guidelines have been produced by Sveriges Kommuner och Landsting, the Swedish Association of Local Authorities (SALA) and by the Federation of Swedish County Councils, and by the local government City of Stockholm. A good example of an accessible playground is 'East of the Sun and West of the Moon', based on a Norwegian fairytale and located in Copenhagen. In Finland, the Lappsett company promote the use of round wood for making play equipment as an alternative to the conventional tubular metal style potentially allowing children with disabilities to indulge in more natural play rather than being over protected.

In the area of **public transport**, much progress has been made in terms of making public transport available to disabled people in general. In February 2005 the European Commission tabled a proposal for a Regulation on the rights of passengers with reduced mobility when travelling by air which will prohibit discrimination against disabled air passengers. Following a long battle over many years by the European Disability Forum (EDF) together with the 'Buses for All' Campaign, a positive final decision was made with the Council of the European Union to secure mandatory access provisions to urban buses in the EU Directive on Buses and Coaches. The EDF has been actively involved in the follow-up work undertaken by the EU since the adoption of the package of EU Directives on Rail which includes specific requirements on access for persons with disabilities. A discussion with the UK government advisory body Disabled Persons Transport Advisory Committee (DPTAC) highlighted the expectation at government level that, unless transport is dedicated specifically to children (e.g. school buses) standards for disabled people are expected to be inclusive of both adults and children. At the same time any changes to standards need to be evidence based.

Regarding **accidents and safety** there is much literature covering children in different environments such as accidents in the home, accidents involving carrycots and transporters as well as in depth studies. Practical guidelines have been produced by Page[21], while Smith-Jackson[22] presents an overview of the important factors researchers should consider when conducting safety-related research that involves children. One issue is whether children with disabilities are at greater risk of accidents than non-disabled ones. One view from an architectural specialist was that children with disabilities are not especially at greater risk, other than the inherent risk associated with particular disabilities, such as dyspraxia which affects coordination or those children who have a reduced concept of risk. This view, however, appears to contradict findings reported in the literature above. Further study may therefore be required to answer this question more precisely. The specialist's view was that the level of risk will be dependent upon the circumstances and the type of disability. However it is not automatic that all disabled children are more at risk as often management can alleviate that risk. In terms of standards relating to accidents and

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PO Box 236, Wetherby, West Yorkshire, LS23 7NB. (odpm@twoten.press.net)
http://www.communities.gov.uk/pub/763/DevelopingaccessibleplayspaceagoodpracticeguidePDF766Kb_id1127763.pdf
[21] Page M. (1986) Child safety and housing: practical design guidelines for commissioning agencies, architects, designers and builders / compiled for the Child Accident Prevention. London: Bedford Square Press for the Trust.
[22] Smith-Jackson, Tonya L. (2002) Child-Centered Safety Research Issues, The Proceeding of the XVI Annual International Occupational Ergonomics and Safety Conference, (ISOES), Toronto, Canada, June 9-12, 2002.
http://education.umn.edu/kls/ecee/pdfs/ChildCenteredSafetyResearchIssues_SmithJackson.pdf

safety, ISO/IEC Guide 50[23] addresses physical hazards to children, but specifically excludes the needs of people with disabilities. It stresses the need for standards to consider child behaviour, response patterns, levels of cognitive behaviour, conceptual abilities at different ages, physical abilities and limitations and age group. Many of these points have particular relevance when considering children with disabilities.

Conclusions and Recommendations

Compared with disabled people and children in general, there seems relatively little information available specifically targeted at the safety, access and usability needs of children with disabilities. Contacts with potentially relevant associations and experts resulted in many "dead ends" and many agreed that there is a need for further research which could lead to the development of new or enhanced standards and guidelines.

To progress the work, specific areas need to be identified where the functional needs of disabled children may differ from the needs of other children or adults with disabilities. Experts recommend that guidelines and standards be made more explicit to clearly demonstrate that a standard is covering children with disabilities. For example recommendations for wheelchair spaces and handrails should provide recommendations to support both adults and children. It may be desirable to develop special sections covering the needs of disabled children such as Part 3 of the Australian standard AS1428.3.

In order to modify existing standards or specify further provisions (e.g. within the ISO draft proposal 21542 on building construction) it may be necessary to produce new ergonomic data relating to children with disabilities. This data should be functional rather than medical in order to span the range of disabilities, and should follow the principles of social participation as laid down in the World Health Organisation's International Classification of Functioning, Disability and Health (ICF)[24]. Since legislation and standards mainly address mobility impairments, people with visual, hearing and cognitive impairments, including those of children, need to be explicitly considered. Factors in CEN/CENELEC Guide 6[25] and CEN Guide 12[26] may be drawn out to ensure full coverage of relevant issues. Another issue is to consider and investigate whether it is possible to use standard dimensions for children with disabilities, e.g. reach, height and levels of strength, for the whole of Europe as a basis for developing standards and guidelines.

New or enhanced standards to accommodate children with disabilities must be accompanied by case studies, advice and support in the principles and practices of inclusive design. This will help to ensure that developers do not merely reach the

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[23] International Organization for Standardization (2002) ISO/IEC 50:2002, Safety aspects - Guidelines for child safety, International Organization for Standardization (ISO), 1, rue de Varembé, Case postale 56, CH-1211 Geneva 20, Switzerland.

[24] World Health Organisation, International Classification of Functioning, Disability and Health (ICF) (2001). Endorsed by the Fifty-fourth World Health Assembly for International use on 22nd May 2001. WHO headquarters, Avenue Appia 20,1211 Geneva 27, Switzerland. http://www3.who.int/icf/ and http://www3.who.int/icf/intros/ICF-Eng-Intro.pdf

[25] CEN/CENELEC Guide 6: 2002. Guidelines for standards developers to address the needs of older persons and persons with disabilities, European Committee for Standardizardization and European Committee for Standardizardization, Rue de Stassartstraat, 35-36, B - 1050 Brussels. http://www.cenorm.be/BOSS/supporting/reference+documents/cclcgd006.pdf

[26] CEN Guide 12: 2006. Child Safety, Guidance for its Inclusion in Standards. European Committee for Standardizardization, Rue de Stassartstraat, 36, B - 1050 Brussels. http://www.cenorm.be/BOSS/supporting/reference+documents/cenguide120606.pdf

minimum standards, but strive to achieve and establish good practice and the highest quality of experience for all users.

Contents

1   Introduction

1.1   Rationale for project

Within European countries and the European Union, there is wide recognition that special consideration must be given to the needs of both people with disabilities and to young people in order that their basic needs are accommodated and their human rights are protected. Some countries have legislation to avoid discrimination against disabled people in different ways in society. Similarly there are laws to ensure that children's welfare is maintained and that they receive the chance to develop to their fullest potential.

In terms of ergonomics, there are many aspects affecting these groups of people such as access to public buildings, safety in the home, presentation of educational materials in a suitable manner, ability to make use of public transport, etc. Authors such as Kroemer[27] have produced much ergonomics information about the needs of both people who are disabled and able-bodied children but it is presented separately.

Yet considering people who are members of both groups i.e. *children who also have disabilities*, their needs may be far less well understood and it is uncertain whether standards or legislation exist to address them. For example handrails may be needed in public buildings for people with limited mobility to make use of, but children with disabilities may also need handrails but at a lower height. Similarly while there are guidelines for toilets for disabled people, what is known about toilets for children with disabilities?

Simpson of Aedas Access[28] has recently written that *"there is a severe lack of information on the needs of disabled children within the environment. There are no current standards of construction and criterion available to assist those in the design and construction process. The legislative imperative is for equality in use, but with no clearly defined criteria to enable one to 'comply' with the [UK] Disability Discrimination Act (DDA), how can today's designers, clients and contractors meet the anticipatory duty? Advice is needed to establish suitable physical levels of inclusion to meet disabled children's needs throughout the various sectors".*

The focus of the project, sponsored by the European Association for the Co-ordination of Consumer Representation in Standardisation (ANEC AISBL – a not for profit organisation) (www.anec.org), was to review the state of knowledge regarding the safety, access and usability needs of children with disabilities.

If the study could identify relevant standards, legislation or guidelines in some Member States, these could potentially be employed by the standards bodies within the European Union and promulgated more widely. If it turned out that there were gaps in knowledge this might indicate a requirement for further research to be carried out to generate suitable guidelines for standards bodies to consider. It could also identify where tools or solutions other than standards may be more appropriate in some sectors or application areas.

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[27] Kroemer, K. H. E. (2006) Designing for "extra-ordinary people": Disabled and elderly, expectant mothers and children, Taylor and Francis and HFES, ISBN: 0-8493-3668-6.
[28] Simpson, J. (2006) Accessible Criterion to Meet Disabled Children's Needs, Paper presented at COBRA 2006, the construction and building research conference of the Royal Institution of Chartered Surveyors. University College London, 7-8 September.

1.2   Scope of project

At the start of the project, it was decided to concentrate upon certain contexts (i.e. physical environments) for the study, excluding areas reasonably well studied such as ICT. It was also decided to consider general policies towards either people with disabilities or for children in order to try to identify any overlaps.

The range of topics covered by the scope of the project (as agreed with the project supervisor) was as follows:

1. General Legislation against disability discrimination.

2. Building regulations related to people with disabilities, possibly including children with disabilities.

3. School buildings and facilities for children with special needs.

4. Safety in the home for people with disabilities, possibly including children with disabilities.

5. Public transport for people with disabilities, possibly including children with disabilities.

6. Access to health and care services for children with disabilities.

It was planned to search for information within the European Union bodies and also from national governments and other organisations within Europe and to focus on a range of countries from different parts of Europe. Initially, this involved a 'broad brush' approach and finally focussed on the United Kingdom (UK), Ireland, Sweden, Greece, Slovenia and Slovakia.

The project reviewed the following types of information:

• National government and European Union (EU) policy and legislation
• Standards (possibly under development) and guidelines
• Results of research studies

The information was gathered from literature searches and reviews. It has also been based upon an email survey among known experts in a range of European countries, and also interviews with key persons in the UK, as described later in the report.

Functional model approach

The general approach of the study is meeting the needs of people in terms of their human functioning, not primarily their disability or medical condition. Thus the aim was to locate guidelines or standards for people with certain functional limitations (e.g. to do with physical movement, vision, hearing, and cognitive impairments for example) rather than with particular medical conditions. This is in line with the World Health Organisation's International Classification of Functioning, Disability and Health (ICF)[29], see http://www3.who.int/icf/ and http://www3.who.int/icf/intros/ICF-Eng-Intro.pdf. A focus of the ICF is human functioning also considering contextual factors

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[29] World Health Organisation, International Classification of Functioning, Disability and Health (ICF) (2001). Endorsed by the Fifty-fourth World Health Assembly for International use on 22nd May 2001. WHO headquarters, Avenue Appia 20,1211 Geneva 27, Switzerland. http://www3.who.int/icf/ and http://www3.who.int/icf/intros/ICF-Eng-Intro.pdf

including various characteristics of the person (e.g. age) and the environment in which the person is interacting with products, services, etc. Since the model covers the life span, it is relevant to both adults and children with disabilities, their activities and participation in society.

2   European survey

2.1   Introduction

A survey of European contacts was carried out to broaden the scope across Europe and included relevant experts in a range of countries. The following standard set of questions was developed and sent to each contact point to ensure that the data collected was comparable across countries:

- Has any research been carried out in your country on the needs of disabled children regarding accessibility, usability and safety?
- Are there any relevant guidelines within your country in the areas of transport, housing, schools, etc., with respect to the needs of disabled children?
- What are the current research issues or findings in these areas?
- Can you provide reports or references for any of the above topics?

Organisations and associations, such as those listed below, were contacted:

- National contacts across Europe through the Association for the Advancement of Assistive Technology in Europe (AAATE)
- Members of European Design for All e-Accessibility Network (EDeAN)
- European Disability Forum - advised by ANEC not to further these enquiries. However, one member offered to help, and although he was contacted, no information was provided.
- Helen Hamlyn Research Centre, Royal College of Art, London
- Nordic Cooperation on Disability
- IFIP Working Group on HCI and Disability

However, very few of these contacts resulted in any particularly useful or relevant information and many "dead ends" were encountered. In fact, certain experts whom had earlier been suggested were either unable or unwilling to contribute. This could either be due to their workloads or possibly because there is so little information available specifically related to children with disabilities (which we now believe to be the case). What did clearly come across is an appreciation of the need for further research and/or standards.

Those able to provide limited information are described below:

2.2   Information provided

A representative from the Royal Institute of British Architects (RIBA) and Aedas Access has provided both her own views and references to relevant standards. Her comments have been integrated where relevant in the appropriate sections below.

A specialist ergonomist at Loughborough University concerning the built environment, provided the Greek perspective. Her comments are provided in the relevant sections below.

Further experts from a range of organisations participated in telephone or email interviews, as listed below. Their comments are included in the appropriate sections of the report.

> Athens University of Economics and Business, European Documentation Centre, Athens, Greece
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> British Standards Institution, Committee Manager for Standards Development, UK
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> Department of Transport, UK
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> Disabled Person's Transport Advisory Committee (DPTAC), UK
>
> Fakulta architektúry Slovenská Technická Univerzita, Bratislava, Slovakia
>
> Handisam (Swedish Agency for Disability Policy Co-ordination), Johanneshov, Sweden
>
> Healthcare Ergonomics & Patient Safety Research Unit Admissions Department of Human Sciences, Loughborough University, Loughborough, UK
>
> Institute for Rehabilitation, Children's Dept., Ljubljana, Republic of Slovenia
>
> International Team, Disability Rights Division, UK Department of Work and Pensions, UK
>
> Loughborough University, Pilkington Library, Academic Library Team Loughborough, UK
>
> Ministry for Health and Children, Dublin, Ireland
>
> Moorfields Eye Hospital NHS Foundation Trust, London, UK
>
> National Disability Authority, Dublin, Ireland
>
> Office for Disability Issues, Department for Work and Pensions, UK
>
> Ricability, UK
>
> Socialdepartementet, Ministry of Health and Social Affairs, Stockholm, Sweden
>
> Special Educational Needs and Disability Division, Department for Education and Skills, UK

A representative from the ACE Centre Advisory Trust in the UK suggested using the website FAST which supports people in easily getting hold of Assistive Technology (AT) at a reasonable cost, is attractive and employs state of the art design and materials. As it covered the same area as this project, it produced some useful links; however, the main emphasis was on assistive technologies rather than mainstream products and services.

A response was received from the University of Valle d'Aosta and at SIVA-Milan in Italy. This person is researching play for children with motor impairment. The first phase of this research had the objectives of finding the needs of this population in terms of both usability and accessibility of toys[30]. In terms of specific guidelines she reported that they were not really well-defined but rather were general guidelines concerning the needs of children with various kinds of disabilities to have access to schools and learning (See http://handitecno.indire.it/naviga/content/index.php?action=inizio&id_madre_cnt=2&area=1 (This site is in Italian).

A response was received from a representative at the Helen Hamlyn Research Centre, Royal College of Art. This person was aware of some research in New

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[30] Besio, S. (2004) Using Assistive Technologies to Facilitate Play by Children with Motor Impairments: A Methodological Proposal, Technology & Disability, 16(3), 119-130.

Zealand on inclusive design and adventure playgrounds that is aiming to include play between children with disabilities and able bodied children. Colleagues in the Faculty had also looked at young people (teenagers) and their need for adult changing benches in toilets, and they also worked with children with autism and looked into their need for less stimulating toilet facilities.

In terms of relevant guidelines the researcher had looked very briefly at the design of school toilets, but not specifically for children with disabilities. She thought that the standards / legislation on school toilets has not been updated since 1937. Given that education policies are calling for more inclusive schooling, something will probably have to be done about inclusively designing school toilets. She also felt that many new hospitals that have been built, especially children's hospitals, do not include adult changing facilities, even though young people with profound and multiple learning disabilities will attend such units from birth until possibly age 18. By the age of 5 many need larger changing spaces than are offered by 'baby change' facilities.

A response was also received from a research specialist at the Fraunhofer Institute for Applied Information Technology (FIT) in Germany who highlighted the Children's Online Privacy Protection Act of 1998 in the US: http://www.ftc.gov/ogc/coppa1.htm and similar acts in other countries. They also provided a contact in Spain at IBV (Instituto de Biomecánica de Valencia) and the relevant Ministry in Germany http://www.bmfsfj.de/, for family, older people, women and young people. Unfortunately emails send to both organisations produced no responses.

It was also planned to interview a Professor of Child Health and a representative of the Child Accident Prevention Trust, face to face. However neither was able to participate due one expert having retired and the other having too little time.

Through a message board for the European Design for All e-Accessibility Network (EDeAN) useful links to European Telecommunications Standards Institute (ETSI) standards were provided; however, the focus was mainly on ICT, as follows:

ETSI EG 202 423 V1.1.1 (2005-10) Human Factors (HF): Guidelines for the design and deployment of ICT products and services used by children.

ETSI TR 102 133 V1.1.1 (2003-04) Human Factors (HF): Access to ICT by young people: issues and guidelines

ETSI TR 103 073 V1.1.1 (2003-11) Universal Communications Identifier (UCI): Improving communications for disabled, young and elderly people

ETSI SR 001 996 V3.1.1 (2005-12) Human Factors (HF): An annotated bibliography of documents dealing with Human Factors and disability

These documents are published by:
ETSI Secretariat, 650, route des Lucioles, 06921 Sophia-Antipolis Cedex, France, and can be downloaded without charge from the World Wide Web site of ETSI at http://www.etsi.com/services_products/freestandard/home.htm

3 Policy and legislation

Many of the following sections provide information which is specific to a particular country or organisation. To highlight this, an image of the appropriate flag is presented below each section heading. So, for example, under the following heading above a section on the United Nations, an image of the UN flag is shown.

3.1 *United Nations Convention on the Rights of the Child*

The United Nations Children's Fund - UNICEF - works for children's rights, their survival, development and protection. The United Nations Convention on the Rights of the Child of 1990[31] (http://www.unicef.org/crc/) is an international convention setting out the civil, political, economic, social and cultural rights of children. The basic human rights that children everywhere have include: the right to survival; an adequate standard of living; to develop to the fullest; to have protection from harmful influences, abuse and exploitation; and to participate fully in family, cultural and social life. The four core principles of the Convention are non-discrimination; devotion to the best interests of the child; the right to life, survival and development; and respect for the views of the child. The Convention protects children's rights by setting standards in health care; education; and legal, civil and social services.

In October 1997, the Committee monitoring the implementation of the Convention, organised a thematic day on the Rights of Disabled Children. A range of organisations working with disabled children, including representatives from International Save the Children Alliance (SC Alliance), participated in discussions on the rights of disabled children to survival, development, education and participation[32]. This document describes the extreme conditions that children with disabilities might face around the world. It also deals with myths and misunderstandings about children with disabilities e.g.

- "We have no discrimination – we treat all children the same."
- "Surely no one would abuse a disabled child?"
- "Disabled children would be safer in institutions wouldn't they?"

The document gives advice on improving practice when dealing with disabled children and how the Convention can be used to promote change.

In 1993, the United Nations (UN) introduced the document "The Standard Rules on the Equalization of Opportunities for Persons with Disabilities". According to the Swedish Institute, this has been the cornerstone of disability policy in countries like Sweden. The Swedish Government is also taking part in the UN's efforts to develop a convention that strengthens respect for the human rights of people with disabilities. Unlike the Standard Rules, conventions are legally binding http://www.sweden.se/templates/cs/FactSheet____13508.aspx.

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[31] United Nations Children's Fund (1990), Convention on the Rights of the Child, Headquarters, United States Fund for UNICEF, East 38th Street, (Mail Code: GC-6), New York, New York 10016. http://www.unicef.org/crc/

[32] Save the children (2001) Disabled children's rights – a practical guide, Author: Hazel Jones, Save the Children Sweden, SE-107 88 Stockholm, ISBN: 91-89366-77-8, www.rb.se

3.2   European Union action plan for people with disabilities

The European Commission published a European action plan for 2004 to 2007 for people with disabilities in the enlarged Union (COM(2003) 650 final)[33] http://europa.eu/scadplus/leg/en/cha/c11414.htm. The plan states that *"equality of opportunity is the objective of the European Union's long term strategy on disability which aims to enable people to enjoy their right to dignity, equal treatment, independent living and participation in society"*.

The action plan is in two phases http://ec.europa.eu/employment_social/index/com_2005_604_en.pdf. The **first phase** of the plan (2004 – 2005) was aimed primarily at promoting employment of people with disabilities. The four priority areas to support this were:
- Access to, and remaining in, employment
- Support for lifelong learning
- Harnessing the potential of new technologies, and
- Accessibility to the public built environment.

Although not directly targeted at children, items 2 to 4 have relevance for them and in particular *accessibility to the public built environment*. The plan requires that the design and construction of buildings be in compliance with the principle of universal design ("design-for-all"). The availability of accessible cultural and leisure facilities is also essential for improving the quality of life of people with disabilities. The Council recognised this in its resolution of 6 May 2003 on accessibility of cultural infrastructure and cultural activities for people with disabilities. Likewise, in its resolution of 21 May 2002 on the future of European tourism, the Council called on the Commission, the Member States and other interested parties to step up their efforts to facilitate accessibility to tourist sites for people with disabilities. Moreover, in its White Paper entitled "European transport policy for 2010: time to decide", the Commission advocated greater use of accessible public transport.

The plan stated that the Commission ought to take further action in the following areas:
- promotion of European standards in relation to all aspects of the built environment, including the planning, design, construction and use of buildings;
- promotion of better education on accessibility issues in schools and among professionals;
- incorporation of accessibility provisions in public procurement policies, taking this dimension into account also in the allocation of the Structural Funds;
- encouragement for the development of studies into the accessibility of tourist sites and infrastructure, and of urban transport systems.

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[33] European Commission (2003) Equal opportunities for people with disabilities: a European action plan (2004-2010), Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions COM(2005) 604 final. http://europa.eu/scadplus/leg/en/cha/c11414.htm

The **second phase** of the action plan (2006-2007)[34] focuses on active inclusion and autonomy (right of persons with disabilities to benefit from measures designed to ensure their independence, social and occupational integration and participation in the life of the community). It proposes four priorities:

- Encouraging activity
- Promoting access to quality support and care services
- Fostering accessibility of goods and services for all
- Increasing the EU's analytical capacity

3.3   European Commission High Level Group on Disability

In line with the European Commission's Directive, COM (96)406 final 1996, http://www.disabilitaincifre.it/allegati/COM(96)406_en.rtf, the DG Employment, Social Affairs and Equal Opportunities, Unit of Integration of People with Disabilities, formed The High Level Group on Disability http://ec.europa.eu/employment_social/soc-prot/disable/hlg_en.htm. The Group consists of representatives of the Member State from the ministry level. Its aims are to:
- Monitor the latest policies and priorities of Governments concerning people with disabilities
- Pool information and experience
- Advise the Commission on methods for reporting in future on the EU-wide situation with regard to disability.

For instance, the High Level Group seeks to identify and compare how the Member States work to eliminate barriers in society and achieve full participation for all. The High Level Group has edited a Compendium on the organisation in each Member State of disability policy-making.

A related website is the European Commission website for the Integration of People with Disabilities at http://ec.europa.eu/employment_social/disability/index_en.html which links to key documents and resources.

The general site for the DG Employment, Social Affairs and Equal Opportunities is located at: http://ec.europa.eu/employment_social/index_en.html which can be searched. However the documents produced that might be relevant to children with disabilities seem to concentrate on social aspects such as welfare benefits for children.

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[34] European Commission (2005) Situation of disabled people in the enlarged European Union: the European Action Plan 2006-2007, Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions COM(2005) 604 final.
http://ec.europa.eu/employment_social/index/com_2005_604_en.pdf

3.4   Legislation and policy in the United Kingdom

3.4.1 Disability Discrimination Act

In terms of law, the UK Disability Discrimination Act (1995 and extended in 2005)[35] http://www.opsi.gov.uk/acts/acts1995/1995050.htm is a critical piece of UK legislation introduced to protect all disabled people against discrimination. This Act aims to end the discrimination that many disabled people face. It gives disabled people rights in the areas of:

- employment
- education
- access to goods, facilities and services
- buying or renting land or property.

The Act is divided into several parts:

> Part 1, Definition
> Part 2, Employment
> Part 3, Access to goods, facilities, services and premises
> Part 4, Education
> Part 5, Transport

General information on the Act is provided via the Government's Direct Gov web portal at:
http://www.direct.gov.uk/DisabledPeople/RightsAndObligations/YourRights/YourRightsArticles/fs/en?CONTENT_ID=4001068&chk=eazXEG.

In general the Act does not differentiate between children and adults, though the most relevant to this study are Part 3, Access to goods, facilities, services and premises, Part 4, Education – which has been amended by the Special Education Needs and Disability Act (SENDA) 2001, and Part 5, Transport. However duties under Part 2, may apply to young adults in relation to employment.

Specific aspects of the DDA are covered in later sections of this report where relevant.

The Disability Discrimination Act was amended in December 2006 to strengthen disabled people's powers to challenge discrimination by including additional clauses such as setting a deadline for public transport to be fully accessible, bringing many private clubs under the law's authority and putting a duty on public bodies to promote disability equality. This new Disability Equality Duty for the public sector (http://www.drc-gb.org/employers_and_service_provider/disability_equality_duty.aspx) means that any public body will need to actively look at ways of ensuring that disabled people are treated equally. This new law requires organisations across the public sector

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[35] Disability Discrimination Act (1995, 2005) The Disability Discrimination Act (DDA), Office of Public Sector Information (OPSI), St. Clements House. 2-16 Colgate. Norwich. NR3 1BQ, UK, http://www.opsi.gov.uk, http://www.opsi.gov.uk/acts/acts1995/1995050.htm and http://www.direct.gov.uk/DisabledPeople/RightsAndObligations/YourRights/YourRightsArticles/fs/en?CONTENT_ID=4001068&chk=eazXEG

(including hospitals, local and central government, schools and colleges) to be proactive in ensuring that disabled people are treated fairly.

The Disability Rights Commission http://www.drc-gb.org/ provides advice, help and support to disabled people and service providers in relation to the Disability Discrimination Act. Its website includes a database of 350 frequently asked questions in relation to requirements on services providers, entitlements of people with disabilities and answers to many different situations. Interestingly, searching on 'children' only produces 3 results all relating to one topic: the care of disabled children in school http://www.drc-gb.org/library/ask_drc/all_questions.aspx?&nCount=6. Such cases would come under Part 4 of the Act.

Building on the Disability Discrimination Act, standards exist related specifically to inclusive design, rather than people with disabilities, for example, BS 7000, Part 6: Managing inclusive design – Guide, which is relevant to all types of products and services.

3.4.2 Children Acts

The Children Act 1989 has the following powers:

- reforms the law relating to children;
- makes provision for local authority services for children in need and others;
- amends the law with respect to children's homes, community homes, voluntary homes and voluntary organisations;
- makes provision with respect to fostering, child minding and day care for young children and for adoption of children.

In 2004 a new Children Act was passed. The Act provides a legislative spine for the wider strategy for improving children's lives. This covers the universal services which every child accesses, and more targeted services for those with additional needs. The overall aim is to encourage integrated planning, commissioning and delivery of services as well as improve multi-disciplinary working, remove duplication, increase accountability and improve the coordination of individual and joint inspections in local authorities. The legislation is enabling rather than prescriptive and provides local authorities with a considerable amount of flexibility in the way they implement its provisions. Details about the implementation of the Act and the wider reform programme are available in Every Child Matters: Change for Children: http://www.everychildmatters.gov.uk/

These acts provide the basis for assisting all children but also in making special provision for children with disabilities. For details of the Children Acts and links see: http://www.dfes.gov.uk/publications/childrenactreport.

3.5 Legislation and policy in Ireland

At a government level, matters related to children are covered by the Department of Health and Children. This department concentrates on the health and welfare of children as typified by the Child Care Act, 1991 (No. 17/1991) which can be viewed at http://acts.oireachtas.ie/zza17y1991.1.html#zza17y1991. This Act considers provision in relation to the care, protection and control of children

and, in particular, to replace the Children Act, 1908, and other enactments relating to juvenile offenders.

A representative, at the Ministry for Health and Children, recommended the National Disability Authority (NDA) and the National Children's Advisory Council as a source of information. The NDA (http://www.nda.ie/), on behalf of the Irish State, promotes and helps secure the rights of people with disabilities. Their responsibilities include policy development, research and advice on standards.

The NDA commissioned a report in 2001 which studied people's attitudes to disability in the Republic of Ireland (National Disability Authority, 2002)[36]. http://www.nda.ie/cntmgmtnew.nsf/0/910C72601D161DE580256CCC005373D5/$File/attitude.pdf. One section of the survey related to the education of children with disabilities. Forty six per cent of respondents agreed that children with disabilities should attend the same schools as children without a disability and 72% agreed that *'children with disabilities should be supported to attend the same schools'*. Therefore the design of schools needs to accommodate them.

3.6   Legislation and policy in Sweden

The following information is adapted from a fact sheet of January 2006, produced by the Swedish Institute, http://www.sweden.se/templates/cs/FactSheet____13508.aspx

A distinctive feature of Swedish legislation is its emphasis on framework laws. These establish the direction and objectives of government policy. Those responsible for the activity concerned, municipalities or county councils, then have considerable freedom in interpreting the objectives and shaping their activities themselves.

A national action plan on disability policy, 'From Patient to Citizen', was adopted by the Riksdag in 2000. This plan has shifted the emphasis in Swedish policies targeting disabled people. Previously government action in this area largely centred on social issues and welfare matters. The emphasis today is on democracy and human rights. Swedish disability policy has been given a clear-cut citizen's perspective.

The policymakers have also shown a determination to introduce broad-based solutions in the quest for a society that is accessible from as many aspects, and to as many citizens, as possible. This is seen as a way of avoiding the need for special solutions for certain groups, an approach that tends to be costly.

Swedish disability policy, therefore, now concentrates on:
 • identifying and removing obstacles to full participation and full equality in society,
 • preventing and fighting discrimination,
 • promoting equality between disabled girls and boys, women and men.

The disability perspective is to become a natural part of all policymaking and all public activities. Government agencies have begun to make their premises, activities and information generally accessible. Public officials are to be trained in disability

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[36] National Disability Authority (2002a) People's attitudes to disability in the Republic of Ireland, National Disability Authority, 25 Clyde Road, Dublin 4, Ireland. http://www.nda.ie/cntmgmtnew.nsf/0/910C72601D161DE580256CCC005373D5/$File/attitude.pdf

issues so that disabled people are not prevented from exercising their rights as citizens as a result of ignorance or degrading treatment or both.

Disabled people's voluntary organisations have an important part to play in Swedish disability policy. The movement has been influencing policy direction in this particular sphere for over 50 years, and its cooperation with Swedish policymakers at all levels is well established. Most of these organisations belong to the Swedish Disability Federation (Handikappförbundens samarbetsorgan, HSO), an umbrella body that seeks to influence official policy in the disability sphere. Around fifty disabled people's organisations receive state funding to help them pursue their activities. Most are organised on the basis of their members' diagnoses. Many of them have special youth sections, and some focus specifically on children and the family.

The Government has established a disability commission to serve as a forum for discussions and exchanges of information between the state and the disabled people's organisations.

The new Swedish Agency for Disability Policy Coordination called Handisam was set up in 2006 (www.handisam.se). Its task is to direct and speed up the work of making Sweden accessible in accordance with the guidelines laid down in the national action plan for disability policy. Handisam supports the sectoral authorities tasked with implementing the national plan for disability policy. It will also develop knowledge concerning accessibility in the community and in particular ensuring that the public sector sets a good example. Handisam has issued Guidelines for an Accessible Government Service to help national authorities make information, facilities and activities accessible to all. Local and regional authorities, business enterprise and organisations are also to be encouraged to adopt a similar inclusive perspective.

Discrimination
Sweden has three laws prohibiting discrimination, one of the grounds cited being disability. The first, the Prohibition of Discrimination in Working Life of People with Disability Act, was adopted in 1999. This was followed in 2002 by the Act on Equal Treatment of Students at Universities (Equal Treatment of Students at Universities Act, 2001)[37] http://195.149.159.99/en/equaltreatmento.asp and in 2003 by the Prohibition of Discrimination Act[38], http://www.sweden.gov.se/content/1/c6/03/07/73/c6e1d81e.pdf, which, in line with SENDA and part 3 of Disability Discrimination Act in the UK, applies to, amongst other things, trading in goods and services.

Rights
Sweden does not have a law specifically establishing the rights of all people with disabilities. Instead, certain laws contain clauses that apply specifically to disabled people, including the Planning and Building Act and the Social Services Act. A further Act (1993:387) concerning Support and Service for Persons with Certain Functional Impairments (LSS) was introduced in 1994. This is a rights law supplementing other legislation. Its aim is to give people with extensive disabilities greater opportunities for leading an independent life and to assure them of equal living conditions and full participation in community life. Support may take the form of personal assistance in

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[37] Equal Treatment of Students at Universities Act (2001) Equal Treatment of Students at Universities Act 2001:1286, Equal Opportunities Ombudsman, Jämställdhetsombudsmannen, Box 3397, S-103 68 Stockholm, Sweden. http://195.149.159.99/en/equaltreatmento.asp
[38] Prohibition of Discrimination Act (2003) Prohibition of Discrimination Act 2003:307, The Government and the Government Offices of Sweden, 103 33 Stockholm, Sweden. http://www.sweden.gov.se/content/1/c6/03/07/73/c6e1d81e.pdf

everyday life, counselling, housing with special services, or relief provision for the parents of children with disabilities. This can be found at: http://www.socialstyrelsen.se/NR/rdonlyres/EC87B7CE-42C8-4DF6-A290-98D9DB9FEE67/5786/200611429.pdf. As its name implies, the law applies only to certain groups of disabled people. People not covered by the law can seek assistance from their municipal authority under the Social Services Act.

There has also been a move to relocate children with intellectual disabilities from care homes to homes in the community. Evaluations of this trend show that it has had positive effects, not just for the intellectually disabled individuals themselves, but also for their relatives and staff. The individuals also receive support under special entitlement legislation known as the Act concerning Support and Services to Person's with Certain Functional Impairments (LSS) – approximately 17,000 of these are children and young people: http://www.socialstyrelsen.se/NR/rdonlyres/78FEA652-0E9D-436D-85BA-A218BA0255E3/6125/200611422.pdf

3.7   Legislation and policy in Greece

Feedback was received from a member of staff at the Athens University of Economics and Business Library, European Documentation Centre. She reported that the main Greek law is the N.1577/85 "General Construction Regulation" (article 26 and 29) which has been supplemented many times over the years. It seems that Greek legislation is in theory relatively more complete than the Community legislation. However, the practical implementation is very difficult due to physical or technical difficulties, e.g. the roads situation in Greece.

3.8   Legislation and policy in Slovenia

A paper was presented by a head-teacher trainer at the Slovenian Leadership School at the International Special education Congress in 2000[39] outlining initiatives in Slovenia for the creation of a more inclusive educational system http://www.isec2000.org.uk/abstracts/papers_t/trtnik_herlec_1.htm. The country became an independent in 1991 after the partition of Yugoslavia, and joined the European Union in Spring 2004. The European Union's approach to equality for all has also been incorporated into Slovenia's education legislation. Article 12 of the Primary Education Act (1996) enhances the integration of children with special needs into the ordinary school programme, so that *"the school adapts the methods and forms of work to them and makes it possible for them to participate in additional lessons and other forms of individual and group help".* Article 49 declares the right of the parents to enrol their child with special needs in their local school. In July 2000, a new Act on Direction-setting (i.e. program selection) for Children with Special Needs was adopted. It introduced new terminology, i.e. "children with special needs" instead of "children with developmental disorders" and specified the educational programmes including adapted methods and extra help but using the same educational standards; adapted lower- or same-standard programs, or special programs, into which the children are directed by the direction-setting committee of experts. It anticipates the integration of all children with special needs who can cope with additional expert

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[39] Trtnik Herlec, A. (2000) Inclusion in Slovenia after the implementation of the new legislation, Proceedings of International Special Education Congress (ISEC 2000), University of Manchester, UK. http://www.isec2000.org.uk/abstracts/papers_t/trtnik_herlec_1.htm

support, adapted teaching techniques, special equipment, smaller groups etc. It also declares the obligation of the school to prepare the individual education plan for the child with special needs.

3.9 Legislation and policy in Belgium

Contact was made with the ISdAC International Association in Belgium which aims to make the Information Society fully accessible to people with disabilities. It was reported that there is little specific legislation regarding children with disabilities. There is a Royal Decree of 1975 which states some accessibility requirements for public buildings, which is a requirement for obtaining a building license. However it was reported that there are in practice ways of avoiding these requirements and thus allowing non-compliance. Furthermore it was stated that there is a lack of sanctions or repercussions if the requirements are not met.

3.10 Legislation and policy in France

France has legislated to improve the accessibility of the built environment as one of the major axes of the new French law n° 2005-102 of 11 February 2005. Accessibility of the whole transport chain (the transport itself - the infrastructure - the buildings and their surroundings) is considered as an essential element for an inclusive society. The law covers not only buildings open to the public (both private and public owned), but also housing. Decrees putting the law into application remain to be published in the coming months.

3.11 Legislation and policy in Spain

In 2003 the Council of Ministers of the Spanish Government approved a national plan on accessibility 2004-2012. The plan was prepared by the Ministry of Labour and Social Security with the help of IMSERSO (Instituto de Mayore y Servicios Sociales). Design for all is a key element of the plan. The plan defines 5 objectives and 18 strategies to reach these objectives. The strategies are further detailed into a series of actions which can be downloaded from the IMSERSO website at http://www.seg-social.es/imserso/dependencia/ipna2004_2012.pdf (in Spanish). When searched through Google, an option is presented to browse the IMSERSO website translated into English, but not the plan which is a PDF document).

4   Public buildings and dwellings

Most countries in Europe have regulations for building companies to follow. There are also standards of good practice which may or may not be legally binding. Regulations and standards for the construction of public buildings (e.g. shops, libraries, council offices, museums, etc.) tend to overlap with those for the construction of dwellings (homes). For the sections below it can be assumed that they relate to both areas unless otherwise specified. An image of the appropriate national or international flag is presented below each section heading.

4.1   International Regulations

An ISO standard for the built environment, ISO 21542 Building construction — accessibility and usability of the built environment[40], is under development. However it is still in its early stages of preparation. The responsible Committee Manager for Standards Development at the BSI stated that publication is expected in late 2008. The new standard is to be based upon BS 8300:2001 (described below). There are no plans at present to include children's needs in the ISO standard, however BS 8300 is currently being revised and there is a Working Group addressing the needs of disabled children and it is planned to include these in the revision.

4.2   Buildings in the UK

In the area of buildings, excluding domestic dwellings, the British Standard BS 8300: 2001[41], covers many areas of building design for people who are disabled.

Figure 1 : Cover page for the British Standard BS 8300: Design of buildings and their approaches to meet the needs of disabled people — Code of Practice

However it includes only two references to children – one that the standard does not make specific recommendations for children and that pre-pay meters should be accessible but protected so that children cannot tamper with them.

There have been comments from a BS Working Group of experts looking at how BS 8300 could be enhanced to include disabled children. These include heights of handrails, door weights, and toilet facilities. Kitchen and canteen facilities need to allow disabled children to fetch their own food and drinks, while changing rooms, tables and hygiene rooms need to suit disabled children.

In general, dimensions and forces quoted need to take account of children especially those with disabilities.

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[40] International Organization for Standardization (2006) ISO/TC 59/SC 16/WG 1, Draft Proposal 2nd version ISO/CD 21542, Building construction — accessibility and usability of the built environment, Secritariat: AENOR, International Organization for Standardization (ISO), 1, rue de Varembé, Case postale 56, CH-1211 Geneva 20, Switzerland.
[41] British Standards Institution (2001) BS 8300: 2001 Design of buildings and their approaches to meet the needs of disabled people—Code of Practice. British Standards Institution, 389 Chiswick High Road, London W4 4AL, United Kingdom.

In order to include the needs of children with disabilities, the Working Group has identified the following areas of work to be carried out:
- Research on the strength of disabled children.
- Include rather than specifically exclude recommendations on children's use.
- Include recommendations on recreational facilities for children.
- Research the correct height and diameter for ramp hand rails for children.
- Check eye height, lines of sight and reach for children in wheelchairs
- Check size data for children in wheelchairs as well as ambulant disabled children.
- Allow larger lifts to accommodate children in wheelchairs and helpers.
- Consider research on lighting needed for children with dyslexia.

The UK Building Regulations http://www.thenbs.com/BuildingRegs/ and http://www.ribabookshops.com/site/viewtitle.asp?sid=&pid=4374 is one of the primary references for good practice which builders have to follow by law. The Regulations are published in several parts: 'Part A, Structure', 'Part B, Fire Safety', etc. Part M concerns the needs of people with disabilities and is often referred to as 'Document M'[42].

Figure 2: Cover page for the UK Building Regulations: 'Approved Document M: Access to and use of buildings'

Document M (Building Regulations, 2004) contains regulations on the design of domestic and non-domestic buildings and their approaches, so that they are convenient to use by disabled people.

The document includes sections on: general principles, access to the building, movement within building, facilities within the building, sanitary accommodation, switches and sockets, and lifts and stairs in blocks of flats.

It also refers to the principles of the Disability Discrimination Act (1995) and to the guidance contained within BS 8300 which is based on recent ergonomic studies.

There are nine references to children including warnings to avoid creating hazards for children, providing second handrails for children, and suitable access for parents with small children and children in pushchairs. If a revolving door is used then there must be an adjacent conventional door with clear signage alongside. The Regulations also cover sanitary accommodation (in buildings other than dwellings) for children and babies. However the document does not appear to make any reference to children with disabilities.

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[42] Building Regulations (2004) The Building Regulations 2000, Approved document M: Access to and use of buildings, 2004 edition, National Building Specification (NBS) for the Office of the Deputy Prime Minister (now Department for Communities and Local Government, DCLG) http://www.thenbs.com/BuildingRegs/ and http://www.ribabookshops.com/site/viewtitle.asp?sid=&pid=4374

There are also a number of Department for Education and Skills (DfES) Building Bulletins that address the needs of disabled children.

- *Building Bulletin 77: Designing for pupils with special educational needs and disabilities in schools[43].*

- *Building Bulletin 91: Access for disabled people to school buildings. Management and Design Guide[44].*

- *Building Bulletin 93: Acoustic design of schools[45].*

- *Building Bulletin 94: Inclusive school design. Accommodating pupils with special needs and disabilities in mainstream schools[46].*

These are referred to within relevant sections of the document. These Building Bulletins aim to provide a comprehensive guide for architects, building control bodies, building services engineers, clients, and others involved in the design of new school buildings.

The Joseph Rowntree Foundation (www.jrf.org.uk) conducts research to understand the causes of social difficulties for sectors of the population and explore ways of overcoming them. Recognising that good housing plays a key role in the well-being of disabled children and their families, in 2002 they conducted a study on housing and disabled children among families and professionals[47]. The main findings were that:

- Much of the good practice found in the study related to awareness raising i.e. highlighting need and services available particularly in relation to ethnic minority communities.
- The roles of key workers, 'one stop shops', or simply a named individual who would be on-hand to listen and advise are well valued means of support.
- Services that families commended were multi-agency teams who understood each other's roles. However they also valued having a designated key worker who worked with the family and co-ordinated the agencies involved.
- The extent to which specific needs of children were recognised by services e.g. need for space for play and considering the long-term development of children, was very important.
- Some services had taken advantage of policy developments to promote opportunities for families with disabled children and to ensure that the needs of disabled people were not neglected within any new initiatives

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[43] Building Bulletin 77 (2005) Designing for pupils with special educational needs and disabilities in schools, Department for Education and Skills, http://www.dfes.gov.uk/consultations/conResults.cfm?consultationId=1335

[44] Building Bulletin 91 (1999) Designing for pupils with special educational needs and disabilities in schools, Department for Education and Skills, ISBN 0 11271 062X.

[45] Building Bulletin 93 (2003) Acoustic design of schools, Department for Education and Skills, London: The Stationery Office, ISBN 011 271105 7. http://www.teachernet.gov.uk/management/resourcesfinanceandbuilding/schoolbuildings/designguidance/sbenvironmentalhs/acoustics/ and http://www.soundresearch.co.uk/Building%20Bulletin%2093%20-%20Schools.pdf

[46] Building Bulletin 94 (2001) Designing for pupils with special educational needs and disabilities in schools, Department for Education and Skills. ISBN 0 11271 109X.

[47] Bevan, M. (2002) Housing and disabled children: the art of the possible, Joseph Rowntree Foundation, York: Joseph Rowntree Foundation www.jrf.org.uk. November 2002. ISSN: 0958-3084. Available from Marston Books, Abingdon, Oxon, email: direct.orders@marston.co.uk.

e.g. promoting the use of choice-based house lettings and ensuring that new web-based services did not create barriers for disabled people.

However a contrasting Rowntree study by Beresford and Oldman (2002)[48] who surveyed disabled children and their families identified a lack of data within local authorities regarding housing needs and demands on housing adaptation budgets. No authority could provide evidence on the extent to which supply matched need and no information was collected on the outcomes of an adaptation or a rehousing solution from the child's or family's perspectives. There was also concern that there was no single agency or department who took overall responsibility for ensuring the housing needs of disabled children living in their authority were met. The report also emphasised the need for housing to embrace all impairments and to extend beyond the 'four walls' of the family home.

Despite the apparent disparity between these reports, the lessons they offer for assisting children with disabilities is clear.

A further report by Allen et al looked at the issues related to housing and urban experiences of visually impaired children[49]. They found that children were able to use memory maps well within their living environment and so measures to address the physical layout are less important to visually impaired children than physically impaired adults. In poor urban areas, the social experience affects visually impaired children's experiences of disability more than the physical layout of the urban environment.

Figure 3: Cover page for the journal Good Autism Practice (GAP)

Whitehurst has written an article in the Good Autism Practice (GAP) journal about the impact of building design on children with autistic spectrum disorders (ASD)[50]. She describes the main features of a new building created as a residential living space for 12 children with ASD. She then interviewed staff and families who compared the responses of the children in their previous accommodation at the school to their responses to the new build.

Architects were also asked to comment on any aspects of the design which created problems.

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[48] Beresford, B. and Oldman, C. (2002) Housing matters: National evidence relating to disabled children and their housing. York: Joseph Rowntree Foundation, www.jrf.org.uk. November 2002. ISSN: 1-86134-483-X. Available from Marston Books, Abingdon, Oxon, email: direct.orders@marston.co.uk.
[49] Allen, C. Milner, J. and Price, D. (2002) Home is where the start is: The housing and urban experiences of visually impaired children. Joseph Rowntree Foundation, www.jrf.org.uk. November 2002. ISSN: 1-86134-456-2. Available from Marston Books, Abingdon, Oxon, email: direct.orders@marston.co.uk.
[50] Whitehurst, T. (2006) The impact of building design on children with autistic spectrum disorders, Good Autism Practice, G. Jones and H. Morgan (eds.) British Institute of Learning Disabilities, 2006, 7, 1, 31-38.

Key features of the design included:
- Single storey construction for safety and ease of movement
- Single bedrooms, for privacy, dignity and personal space
- Circulation spaces which make good use of space and can be utilised for play
- A range of communal areas and quiet spaces
- Outdoor space with areas covered by canopies
- Curved walls, avoiding harsh corners
- High-level windows in addition to low level for extra daylight
- Soft, non-flickering compact lighting which reduces effects of bright fluorescent light on some children with ASD
- Under-floor heating and floor coverings to maintain warmth and reduce noise
- Ceilings with sound-absorbent backings
- Colour schemes (such as pink, purple and non-reflective colours) to provoke neither a positive nor a negative reaction
- Bedrooms arranged in a zigzag pattern to give window views without being overlooked
- Bathrooms that allow easy movement and time out taps to reduce flood risk.
- Sensory rooms
- Staff rooms and offices with a good view of the circulation space and bedroom wing
- Kitchen providing a good practical working area for staff
- Dining-room with a serving hatch to the kitchen thus reducing the risk of children entering the kitchen while food is in preparation

Some modifications were required to the design after staff and family feedback, and many of which were achieved with little effort. Evidence indicated that certain design features were important in ameliorating some of the difficulties experienced by children on the autistic spectrum. They have also promoted social interaction between the children and staff. Having individual space meant that children could make a choice to be alone or interact. Historically, children with ASD have been portrayed as isolated loners living within their own world. The author speculates that maybe this is because in the past they have not been provided with an environment that supports such interaction, communication and more imaginative play.

4.3   Buildings in Ireland

The Building Regulations of the UK form the basis for other countries, including Ireland, Australia, Canada, United States, Denmark and Finland. The Irish 1991 Building Control Act led to the Building Regulations coming into force in June 1992. Specific amendments were made in 2000 which extended the *Building Regulations Technical Guidance Document M*, to dwellings and provided for new dwellings to be

accessible for visiting by people with disabilities[51].
http://www.environ.ie/DOEI/DOEIPol.nsf/0/a137e0322d60e09780256f5d00504a79/$FILE/30184%20BR%20Disabillity%20M.pdf
As with Part M in the UK these regulations do not cover the needs of disabled children.

The National Disability Authority (Rogerson et al) in Ireland carried out a review of the effectiveness of Part M of the Building Regulations[52] http://www.nda.ie/cntmgmtnew.nsf/0/20DF93378F6803108025715A004EAA2D/$File/nda_part_m_submission_01.htm. The aims of the study were: to provide a technical evaluation of Part M against other relevant standards in other jurisdictions; to identify deficiencies in the minimum standards by consulting with people with disabilities; and to identify practical issues impeding the application of the regulation via discussions with stakeholders (i.e. those concerned with designing, supervising and constructing buildings and enforcing regulations).

The study compared the building regulations of Ireland with those of Australia, Canada, United States, Denmark, England and Wales and Finland.

The requirements of Part M: 2000 in Ireland include:
- *Access & Use M1:* Adequate provision shall be made to enable people with disabilities to safely and independently access and use a building.
- *Sanitary Conveniences M2*: If sanitary conveniences are provided in a building, adequate provision shall be made for people with disabilities
- *Audience or Spectator facilities M3:* If a building contains fixed seating for audience or spectators, adequate provision shall be made for people with disabilities
- *Definition M4:* In this Part, "people with disabilities" means people who have an impairment of hearing or sight, or an impairment which limits their ability to walk, or which restricts them to using a wheelchair.
- *Application of this Part M5:* Part M does not apply to works in connection with extensions to and the material alterations of existing dwellings, provided that such works do not create a new dwelling.

The report covers car parking, external access routes, ramps, entrance doors, steps and stairs, internal circulation, sanitary arrangements, communications and way finding. Some of the key findings of this research were:
- People with disabilities still experience significant difficulties in accessing and using buildings. Problem areas identified include access to buildings from the street or car park; entrance doorways and intercoms; internal circulation; toilets; audience facilities;

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[51] Stationery Office, The (2000) Building Regulations Technical Guidance Document M, Government Publications Sale Office, Sun Alliance house, Molesworth Street, Dublin 2, Ireland.
http://www.environ.ie/DOEI/DOEIPol.nsf/0/a137e0322d60e09780256f5d00504a79/$FILE/30184%20BR%20Disabillity%20M.pdf
[52] Rogerson, F., Mc Namara, M., Winters J., and Marsh, K. (2005) A Review of the Effectiveness of Part M of the Building Regulations, Dublin: National Disability Authority and Fionnuala Rogerson Architects.
http://www.nda.ie/cntmgmtnew.nsf/0/20DF93378F6803108025715A004EAA2D/$File/nda_part_m_submission_01.htm

- The access problems experienced include areas which are covered by the Irish Building Regulations Technical Guidance Document M, as well as areas where the technical guidance is absent or inadequate;

- Part M mainly addresses mobility impairments, and does not adequately address the problems experienced by people with hearing impairments, vision impairments, or intellectual disabilities.

Both Finland and Denmark have requirements for handrails on all ramps and steps at a height suitable for children or people of small stature (i.e. handrails at two heights) which other countries do not.

Rogerson found that the Building Regulations Technical Guidance Document M has more limited requirements when compared with other countries. The authors therefore made recommendations to improve the effectiveness of the document and thereby improve access to, and use of, public and private buildings by people with disabilities. As a result of Rogerson's report, the NDA made specific recommendations which included the following:

- The definition of disability used in Part M (M4) should reference the Disability Act 2005 and it should include people with a range of impairments including, amongst others, people with hearing, speech, vision, mental health, intellectual or physical impairments, including those impairments which limit mobility, dexterity, arm movement and hand movement;

- Technical guidance standards for other key building elements should be raised to either the standards set out in BS 8300 or in Building for Everyone[53] whichever is the higher (detailed technical recommendations are spelled out in the body of this submission);
http://www.nda.ie/cntmgmtnew.nsf/0/EBD4FB92816E8BB480256C830060F761?OpenDocument.

- Technical guidance should refer to the importance of managing buildings to ensure that accessibility is maintained;

- The standards set out in Part M need to be reflected in other parts of the Building Regulations. For example, the standards set out in Part K (Stairways Ladders, Ramps and Guards) for semi-public and public stairways should conform to the standards set out in Part M and address maximum rise and going, the provision of coloured nosings (separate colours for top and bottom steps, and for intermediate steps), and handrails. The maximum ramp slope in Part K should be 1:20;

- In the case of extensions to non-domestic buildings, the NDA recommends that the access route from the existing building to the extension be compliant with Part M;

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[53] National Disability Authority (2002b) Building for Everyone (detailed technical recommendations are spelled out in the body of this submission). National Disability Authority, 25 Clyde Road, Dublin 4, Ireland.
http://www.nda.ie/cntmgmtnew.nsf/0/EBD4FB92816E8BB480256C830060F761?OpenDocument

- It should be mandatory that access routes to the entrance door from the street or car park be accessible. This could be achieved either by bringing this within the scope of Part M and/or of the Disability Access Certificate process in the Building Control Bill or by ensuring that such provisions are included in each local authority's Development Plan;

- 10% of new homes, all purpose-built social housing and all one-off houses should be built to full Lifetime Adaptable housing standards. These standards include gentle access from the street and car parking space, adequate width of doorways and hallways, accessible switches, sockets, doorknobs and window catches, wheelchair-adaptable bathrooms/WCs, provision for future downstairs bed space, downstairs shower and future stair lift in 2-storey homes. Core elements of these Lifetime Adaptable Homes standards should be mandatory for all new homes.

4.4 Buildings in Sweden

A contact within the organisation Handisam supplied information on a document relating to the design of buildings to meet the needs of children with disabilities.

One publication shown in the figure opposite is entitled "Bo bra med rörelsehindrat barn. Förslag till bostadsanpassning" and is concerned with the adaptation of dwellings for children with reduced mobility published by the Swedish Handicap Institute (1990)[54].

Although this publication can no longer be ordered it, the Handisam contact thought that it would be available from libraries in Sweden or the Swedish Handicap Institute www.hi.se.

Figure 4: Front cover of the Swedish Handicap Institute guidelines document on buildings design for children with disabilities

Research has also been carried out to develop a checklist for access to libraries for disabled people[55]. As well as providing information for disabled people in general, the paper covers the children's department in particular. It states that children with different kinds of impairments should obviously be able to come to the children's department and spend time there choosing books, playing computer games, listening to story telling, or taking advantage of whatever services and programmes the library offers to children. It should be easy to find the children's department with clear signage or perhaps a leading line to follow. Shelves and picture book cases should be accessible for a child in a wheelchair. The aisles between shelves should not be

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[54] Swedish Handicap Institute (1990) Bo bra med rörelsehindrat barn. Förslag till bostadsanpassning (adaptation of dwellings for children with reduced mobility) www.hi.se.
[55] Nielsen, G. S. and Irval, B. (2005) Access to libraries for disabled persons checklist: a practical tool. World Library and Information Congress: 71sth IFLA General Conference and Council, "Libraries – a voyage of discovery" August 14th-18th 2005, Oslo, Norway. http://www.ifla.org/IV/ifla71/papers/113e-Nielsen_Irval.pdf

cluttered with toys. Special media for children should be kept in the children's department, and not in a special department for adults with reading problems. The paper also states that children's librarians should give service to all children including those with disabilities.

4.5 Buildings in Greece

A discussion took place with a freelance lecturer from Greece who specialises in inclusive design and the built environment. She reported that in Greece there was no legislation concerning the needs of children with disabilities but only guidelines for nurseries which recommended, for instance, toilet seats and sink taps being set at a lower level. The Ministry for Tourism has produced guidelines for camping facilities that cover children's needs. Regarding the accessibility of houses for people with disabilities Greece is following EU directives.

4.6 Buildings in Slovakia

Contact has been made with the Institute of Spatial Planning and Urban Design in the Faculty of Architecture (Fakulta architektúry) at the Slovenska Technicka Univerzita (STU) in Bratislava, Slovakia http://www.fa.stuba.sk/buxus/generate_page.php?page_id=1062.

Within the Institute, there was email exchange with one of the senior lecturers who ran a seminar 'Children Playgrounds and Sports Grounds in the Settlement Structures from the Urban Planning Point of View' for the Society for Landscape and Garden Creation at Nitra, on 6th October 2005.

In reply to a query about local standards, they replied that in Slovakia, there is a standard for the design of the environment for disabled people (Guideline No.192/1994, issued by the Ministry of Environment). This standard contains directives for the design of the environment for disabled people but they are not listed according to building type. They only reflect general aspects of buildings such as entrances from the outer environment (e.g. via lifts, floors) and inner areas i.e. living space parameters such as communications, equipment, space, etc. The website for the Ministry is located at: http://www.enviro.gov.sk/servlets/page/166

Research work has also been done by Samová et al on the design of houses for disabled people which has produced associated guidelines [56] [57].

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[56] Samová, M., Puškár, P., Mikulová, Z. (1999) Bývanie bez bariér, architektonická príručka navrhovania rodinných domov a bytov pre osoby s obmedzenou schopnosťou pohybu. Prvá stavebná sporiteľňa, (Houses for disabled / architectural manual of family houses for disabled)

[57] Samová, M., Puškár, P. (1997) Bezbariérová architektonická tvorba z hľadiska nevidiacich a slabozrakých osôb. Metodická príručka, Únia nevidiacich a slabozrakých Slovenska, Sekulská 1, 84250 Bratislava, (Architectural design for disabled / methodological guidelines)

4.7 Buildings in Australia

The Australian 4 part standard AS1428 covers the design of buildings in the public and commercial sectors for access by disabled persons:

AS 1428.1: 2001
Design for access and mobility - part 1: General requirements for access - new building work, Committee ME-064[58].

AS 1428.2: 1992
Design for access and mobility - part 2: Enhanced and additional requirements – buildings and facilities, Committee ME-064[59].

AS 1428.3: 1992
Design for access and mobility - part 3: Requirements for children and adolescents with physical disabilities ME-064[60].

AS 1428.4: 1992
Tactile ground surface indicators for orientation for people of vision impairment ME-064[61].

The standard covers a wide range of facilities including: walkways, ramps and landings, handrails and grabrails, doorways, doors and circulation space at doorways, lifts, stairways, sanitary facilities, controls, surfaces on a continuous accessible path of travel, car parking facilities, signs indicating access for people with disabilities, seating in places of public entertainment, hearing augmentation listening systems and lighting.

Part 3 relates to children and adolescents with physical disabilities. The Standard is divided into age groups and disability types. The requirements are based on a research report completed by Bails and Seeger in 1988[62] so it may be somewhat dated. The research aimed to determine the physical capabilities of children with disabilities to determine if their needs differed from other groups in the community and to provide guidelines for design. Full-size test equipment was used to test the mobility, reach and strength capabilities of 288 children including 109 able-bodied children. Test subjects were selected to cover various types of physical disability and ages from 3 to 18. At the test site 30 separate items of test equipment were used to measure and record 72 variables to cover the various capabilities, preferences and dimensional details of children.

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[58] Standards Australia (2001) AS 1428.1: 2001, Design for access and mobility - part 1: General requirements for access - new building work, Committee ME-064, Standards Australia, GPO Box 542, Sydney, NSW 2001, Australia.
[59] Standards Australia (1992a) AS 1428.2: 1992, Design for access and mobility - part 2: Enhanced and additional requirements – buildings and facilities, Committee ME-064, Standards Australia, GPO Box 542, Sydney, NSW 2001, Australia.
[60] Standards Australia (1992b) AS 1428.3: 1992, Design for access and mobility - part 3: Requirements for children and adolescents with physical disabilities ME-064, Standards Australia, GPO Box 542, Sydney, NSW 2001, Australia.
[61] Standards Australia (1992c) AS 1428.4: 1992, Tactile ground surface indicators for orientation for people of vision impairment ME-064, Standards Australia, GPO Box 542, Sydney, NSW 2001, Australia.
[62] Bails, J. H. and Seger, B. R. (1988) Ergonomic design for physically disabled children. Adelaide, S. A.: South Australian Department of Housing and Construction.

The research showed that:
  (a) In most cases, capability and size depended on age.
  (b) Except for reach for some wheelchair users, most abilities of both non-disabled and disabled children increase rapidly as age increases from 3 to 18 years
  (c) The abilities of disabled children are much less than those of non-disabled children but the abilities of disabled adolescents approach the abilities of disabled adults by age 18 years.

The guidelines presented in Part 3 of the standard (AS 1428.3: 1992) are structured according to age group and disability group. These groups are shown below:

Age groups
       3   to   6.5 years
     6.5 to 10.5 years
    10.5 to 14.5 years
    14.5 to 18   years

Disability groups
    Group F – Fit able-bodied children including those with intellectual disabilities
    Group A – Ambulant children with physical disabilities who use no visible aid to mobility.
    Group S – Ambulant children who use sticks, crutches or walking frames to assist mobility.
    Group M – Children who use manual wheelchairs
    Group E – Children who use electrical wheelchairs

The Standard does not include requirements for children with sensory disabilities:

The recommendations from the report which have been adopted in the Standard will allow access for at least 80% of children and adolescents with physical disabilities. The 80% rule has been generally accepted as the minimum provision for adults with disabilities in AS 1428.1, 'Design for access and mobility, Part 1: General requirements for access – Buildings'. Where the access needs of children and adolescents are identical to those of adults, the Standard calls up the requirements in AS 1428 Part 2 - Enhanced and additional requirements – buildings and facilities.

AS1428 Part 3 includes specific advice for physically disabled children covering: walkways, ramps and landings, stairways, handrails, sanitary facilities, reach ranges, controls, furniture and fitments, drinking fountains and vending machines. Appendices provide data for all users for horizontal reach over bench surface, vertical reach above a bench surface, reach along a side wall and frontal reach. A further appendix also provides a table of wheelchair dimensions and size code for determining spatial needs. Some images from the standard are shown below:
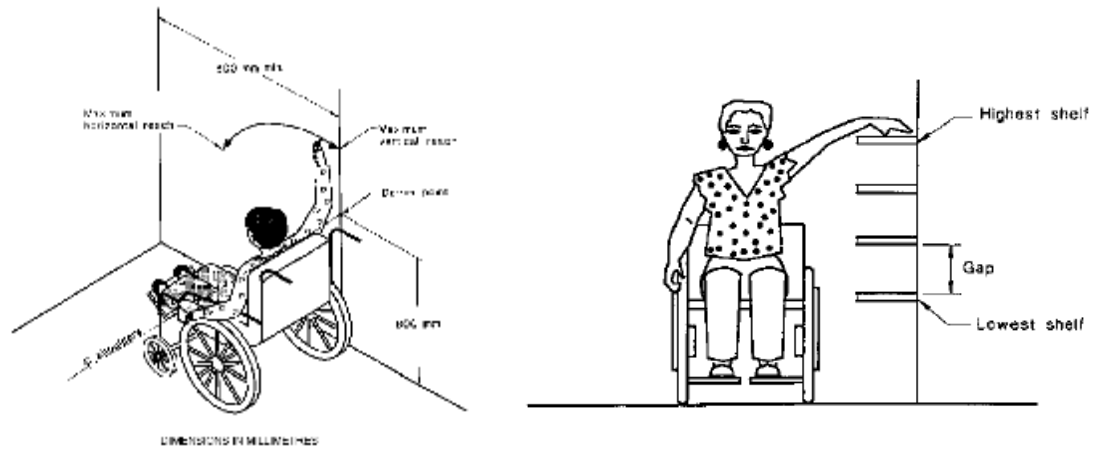
Figure 5: Example dimensions from Australian standard AS1428.3 (1992). The image on the left shows the maximum horizontal and vertical reach of a child wheelchair user. The image on the right shows the highest and lowest recommended heights for shelves, and the recommended gap between shelves with a child wheelchair user reaching up to the highest.

5   Sanitary Facilities

An image of the appropriate flag is presented below each section heading.

5.1   EU research projects

The Friendly Rest Room project[63] was supported by the EU within their programme on the Quality of Life and Management of Living Resources, Key Action 6: the ageing population and disabilities (2002-2004). The aim of this project was to develop a user-friendly rest room for elderly people and people with limited abilities, using sociological, ergonomic and anthropometric studies and technical developments. No specific mention was made of children with disabilities.

Further research in the UK[64] has investigated the design of "away from home" toilets and found that many fail to follow standardised design guidance. The aim of this research was to illustrate that an inclusive design approach within the toilet facility will benefit not only people with disabilities but also older people, and parents with young children, etc. However, the study did not include the specific needs of children with disabilities.

Further activities, rather than research, are also potentially relevant. For example, the Design Directions competition, hosted by the Royal Society of Arts, Manufactures and Commerce (RSA) recently promoted user friendly school toilets as one of its competition categories. Innovative designs were submitted by design students across Europe, but there was no particular relevance to standards.

5.2   UK standards, regulations and resources

The British Standard on Sanitary Installations[65] comprises 3 parts:

- BS 6465-1:2006 Sanitary installations – Part 1: Code of practice for the design of sanitary facilities and scales of provision of sanitary and associated appliances.
- BS 6465-2:1996 Sanitary installations – Part 2: Code of practice for space requirements for sanitary appliances.
- BS 6465-3:2006 Sanitary installations – Part 3: Code of practice for the selection, installation and maintenance of sanitary and associated appliances.

The standard covers many different settings including private dwellings, residential or nursing homes, workplaces, shops and shopping malls, petrol stations, schools,

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[63] de Bruin, R. and Molenbroek, J. (2003) On the Development of a Friendly Restroom, Include 2003, London: Royal College of Art.
[64] Bichard, J., Hanson, J. and Greed, C. (2006) Away from Home (Public) Toilet Design: Identifying User Wants, Needs and Aspirations, in Designing Accessible Technology, J. Clarkson, P. Langdon and P. Robinson (eds), Proceedings of CWUAAT 2006. London: Springer-Verlag.
[65] British Standards Institution (1996, 2006) BS 6465-parts 1, 2 and 3: Sanitary installations, British Standards Institution, 389 Chiswick High Road, London W4 4AL, United Kingdom.

assembly buildings, hotels and hostels, restaurants, pubs bars and nightclubs, swimming pools.

Part 1 contains the following guidelines in relation to children:
- Doors to WC compartments should be fitted with safety locks which can be easily operated by the user and easily released from the outside for access in case of emergency. Note: This is particularly important where use is by older or disabled people or children.
- At least one wash basin and one urinal should be fitted at low level for shorter people and children. In areas for use by children such as a school, appliances, locks, hooks, etc. should be fixed at an appropriate height for the age group using the facilities.
- Nappy (diaper) changing facilities in areas where young children are likely to be present should be provided.
- Where it is desired to make greater use of school facilities for purposes such as adult education or social activities, the choice, layout and location of sanitary appliances should be appropriate for both child and adult use.
- For nursery school children small WCs or wall-hung WCs fitted at low level should be provided.

Part 1 (section 6.7) relates particularly to schools and tabulates the minimum provision of type and number of sanitary appliances in special schools, nurseries, primary schools, secondary schools, and residential boarding schools. The term 'special schools' is not defined within the standard, but it refers to the UK's national minimum standards and inspection regulations for residential special schools (Department of Health, 2002). The standard also states that separate staff facilities should be provided except that facilities for disabled staff may be shared with pupils.

Part 1 also describes the requirements for toilets for disabled people in buildings other than private dwellings:
- Where there is only one toilet in a building, it should be an enlarged wheelchair accessible unisex type.
- At least one wheelchair-accessible unisex toilet should be provided at each location where sanitary facilities are provided for the use of staff, customers and visitors to a building.
- At least one ambulant accessible WC cubicle for ambulant disabled people should be provided in separate sex toilet accommodation. Additionally, where there are 4 or more WC cubicles (in addition to the unisex facility), one larger WC cubicle 1200mm wide, for people who need extra space, should be provided in both male and female separate sex toilets.
- In toilet areas serving a large number of visitors, such as large sports stadiums and shopping centres, the provision of one enlarged wheelchair accessible unisex toilet capable of including an adult changing bench should be considered.

The standard also states that the size, layout and fittings in the toilets for disabled people should be in accordance with the recommendations of BS 8300. It also draws attention to the additional requirements for the provision of toilets, baths and showers for disabled people in the English and Welsh Building Regulations (Approved Document M) and equivalents in Scotland and Northern Ireland.

Part 2 of BS 6465 refers to bath activity space and states that enough room (1100mm x 700mm) must be provided alongside a bath for an adult bathing a child. It also states that cubicles in public conveniences need to have enough space to accommodate adults accompanied by small children. It also states that the design of

a household bathroom should accommodate the possibility of alterations to cope with the needs of elderly, infirm or disabled people. It also states that disabled people are likely to prefer showers to baths and wheelchair users require level access to showers, spaces beneath wash basins and enough room for manoeuvring. Greater activity space is also recommended for people using mobility aids. This part also states that the recommendations do not cover the needs of all disabled people and further reference should be made to the British Standards BS 5619: 1978[66] and BS 5810: 1979[67].

Part 3 of BS 6465 which covers selection of bath shower and toilet facilities, warns that whirlpool baths need to be filled to the level of the jets to function. Users who only require a shallow bath such as children, might not be able to have the moving water functions operating. This may be particularly relevant for disabled children whose parents might purchase such a facility for therapeutic purposes. The standard also states that saunas are not suitable for babies or children. It also states that while bidets are not fitted as standard in UK bathrooms, (due to space limitations and complexity of plumbing) they could be employed as wash basins for young children. Part 3 also states that the height of WC pans should be appropriate to the intended age group. They have similar dimensions to conventional pans except that they are considerably lower in height and can be fitted with smaller seats. Some conventional wall hung pans can be lowered for children to use them easily while WCs are available that incorporate small seats within the lid to accommodate children more safely. The standard also states that baby changing facilities should be provided with a sanitary disposal unit, including access to a WC to act as a sluice and a washbasin unit with hot and cold water. Also an impervious surface large enough for the child to lie on should be provided.

It can be seen that while BS 6465 addresses the needs of children and disabled adults well, it does not specifically address the needs of children with disabilities. One problem may be that toilets designed for disabled adults may be too large for children with disabilities who may find the large areas daunting, be unable to locate toilet and wash basin controls and handrails or may struggle to reach them.

The Approved Document M Building Regulations specify that baby-changing facilities must not be located in wheelchair accessible unisex toilets (compared to the United States of America where it is specified that baby-changing facilities must be accessible to wheelchair users). There is also a recommendation that in large building developments separate facilities for baby changing and an enlarged unisex toilet incorporating an adult changing table are provided.

The UK charity ERIC (Education and Resources for Improving Childhood Continence) http://www.enuresis.org.uk/ has launched a number of campaigns to support child health and continence. Their campaign to support better toilets has the following aims:
- To increase awareness of the health benefits of better toilets for pupils
- To encourage schools to improve the condition of pupils' toilets and to allow pupils to use them when they need to
- To get laws that will make pupils' toilets nicer to use

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[66] British Standards Institution (1978) BS 5619: 1978, Code of practice for design of housing for the convenience of disabled people, British Standards Institution, 389 Chiswick High Road, London W4 4AL, United Kingdom.
[67] British Standards Institution (1979) BS 5810: 1979, Code of practice for access for the disabled to buildings, British Standards Institution, 389 Chiswick High Road, London W4 4AL, United Kingdom.

The site states that the only specific legislation on toilets for pupils in England and Wales is Statutory Instrument No. 2 'The Education (School Premises) Regulations 1999'. This law specifies the number of toilets and washbasins that pupils must have. There is no mention in the legislation of cleanliness, privacy or condition. In contrast, adults in the workplace, including school staff, are covered by comprehensive legislation and guidance: *The Workplace (Health, Safety and Welfare) Regulations (1992) [Statutory Instrument 1992 No. 3004]* (see www.legislation.hmso.gov.uk/si/si1992/Uksi_19923004_en_1.htm)

A factsheet produced by the 'Better toilets for pupils' campaign (http://www.bog-standard.org/factsheet_019.aspx) covers building regulations, particularly for pupils with disabilities and special needs. The website for the Campaign cites parts of the building regulations that are relevant: Part F on ventilation, Part G on hygiene, Part H on drainage and waste disposal and part M on access and facilities for disabled people. The Campaign website also provides some helpful comments on the relationship of Part M to school toilets:

"Although Part M guidance is related to toilets for disabled people and not specifically for children, all schools must comply with Part M regulations and these requirements therefore support the provision of adequate school toilets. A child does not need to have a permanent disability to find the extra facilities helpful. For example, an alarm may re-assure a child who is afraid of being bullied and the regulations state that the emergency assistance call signal is located so that it can be easily seen and heard by those able to give assistance – not just outside the washroom door. Also, an accessible toilet has to be not more than 40m from a disabled person using the building, and, although 40m is a long distance, it is at least a standard which is enforceable which may help children with urgency or frequency for whatever reason."

6   Car parking

Comparison of countries

The UK Building Regulations in Document M covers car parking and accessible bays for non-domestic buildings. This will clearly be of relevance to children with disabilities. It is interesting to compare the different requirements for different countries based on Rogerson's study[68] for the National Disability Authority in Ireland. This shows that the number of accessible parking bays is 5-6% in England and Wales, 4% in Finland, 10% in Denmark (or 5% if special vehicle) and not specified in Ireland. The minimum size of accessible bays is 3.6m x 6m in England and Wales, 3.6m x 5m in Finland, 3.5mx5m in Denmark (or 4.5mx8m if special vehicle) and not specified in Ireland.

According to Rogerson, other guidance given in relation to vehicle parking includes, among other things, guidance on ticket machines and control barriers (England & Wales), vertical and horizontal markings, and automatically opening garage doors (Finland), van parking spaces (U.S. Finland, Denmark), bus loading zones (U.S.), covered car access (Denmark) and barrier free pedestrian routes from parking to entrances (Canada, England & Wales). Barrier free pedestrian routes from within parking areas are considered important for all disabled people as well as for children. This was highlighted in discussions with the Irish National Association for the Deaf.

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[68] Rogerson, F., Mc Namara, M., Winters J., and Marsh, K. (2005) A Review of the Effectiveness of Part M of the Building Regulations, Dublin: National Disability Authority and Fionnuala Rogerson Architects.
http://www.nda.ie/cntmgmtnew.nsf/0/20DF93378F6803108025715A004EAA2D/$File/nda_part_m_submission_01.htm

7　School and nursery buildings

Within European countries there is an increasing acceptance that mainstream schools should be made accessible to children with disabilities. An image of the appropriate national flag is presented below each section heading.

7.1　School buildings in the UK

In the school environment pupils with disabilities have rights under the Children Act of 1989 http://www.direct.gov.uk/DisabledPeople/RightsAndObligations/YourRights/YourRightsArticles/fs/en?CONTENT_ID=4001068&chk=eazXEG and the Disability Discrimination Act (1995 and 2005) Part 4: Education and amended by the Special Educational Needs and Disability Act 2001 (SENDA)[69]. These Acts establish the health, safety and welfare of all pupils and entitlement to education (pre- and post-16).

From September 2002, local education authorities (LEAs) and schools were required to plan to increase progressively the accessibility of schools to disabled pupils. The Department for Education and Skills (DfES) has produced guidance documents to help schools and LEAs with this planning process[70] http://www.teachernet.gov.uk/_doc/2220/Access_Guide_.doc and[71] http://www.teachernet.gov.uk/wholeschool/sen/disabilityandthedda/guidancedisabilityequalityinschools/.

Two aspects of making schools accessible are (1) improving the physical environment of schools and (2) improving the delivery of information to disabled pupils.

The document explains that all new school buildings should be physically accessible to disabled pupils. Buildings of historical or architectural significance also need to be made accessible in line with building regulations. Bodies such as English Heritage provide guidance on ways in which this can be achieved.

7.1.1　Improving the physical environment

Much of the work involves improving access to existing buildings including for instance rearranging room space, removing obstructions from walkways, changing

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[69] SENDA (2001) Special Educational Needs and Disability Act 2001, Office of Public Sector Information (OPSI), St. Clements House. 2-16 Colgate, Norwich, NR3 1BQ, UK, http://www.opsi.gov.uk/acts/acts2001/20010010.htm.
Braille copies can be purchased by contacting TSO Customer Services on 0870 600 5522 or e-mail: customer.services@tso.co.uk. Further information available at: http://www.direct.gov.uk/DisabledPeople/EducationAndTraining/EducationArticles/fs/en?CONTENT_ID=4001076&chk=AftwGD

[70] Department for Education and Skills (2002) Accessible schools: Planning to increase access to schools for disabled pupils, The Schools and Disability Access Team, Department for Education and Skills, Sanctuary Buildings, Great Smith Street, London, SW1P 3BT. 14 January 2002. Available from: http://www.teachernet.gov.uk/_doc/2220/Access_Guide_.doc.

[71] Department for Education and Skills (2006a) Promoting Disability Equality in Schools, Draft Word version available at: http://www.teachernet.gov.uk/wholeschool/sen/disabilityandthedda/guidancedisabilityequalityinschools/

the layout of classrooms, designated storage space or by reallocating rooms to particular subject specialisms. (A checklist of points is provided in Appendix 5 of this document.) Suggestions are made for low cost modifications such as: the installation of lever taps to the sinks in the science labs, food technology and art rooms, or the installation of a 'Soundfield' ® system to provide 'ubiquitous sound' from a microphone worn by the teacher. If a school was planning to refurbish a teaching area or block, it might plan to install low pile, high density carpet as this helps wheelchair users to move with greater ease within the block. It might also plan to make improvements to lighting, colour contrasting décor and signage.

7.1.2 *Improving the delivery of information*

Here schools need to plan to make written information normally provided by the school to its pupils available to disabled pupils. This should take account of pupils' disabilities, pupils' and parents' preferred formats and be made available within a reasonable time frame. The information might include handouts, timetables, and information about school events. The school might consider providing the information in alternative formats (such as large print and audio tape) using ICT, or providing the information orally.

The guidance document Department for Education and Skills (2002) provides examples of how LEAs can help schools. For example, after an audit of educational resources, it might set up a bank of materials in alternative formats to be loaned to schools as necessary. The LEA might also plan to set up a website for its schools providing information on the support available for converting information into different formats, including training, and to encourage schools to link up and share good practice.

Schools are advised to plan how they will provide the written material they usually provide for all pupils to disabled pupils within a reasonable time. Plans could include provision of more information pictorially and orally and the use of lip speaking so that disabled pupils can access material. Training is also needed (which might be provided by LEAs) to enable teachers to produce day-to-day materials to support curriculum access.

The Department for Education and Skills guidelines also provide advice on producing an accessibility strategy. This includes the stages of:
• Performing an access audit
• Identifying actions
• Setting goals and targets
• Consulting on and publish strategy
• Implementing and reviewing achievement.

Certain Building Bulletins also address the design of accessible school environments:

Building Bulletin 77 (2005) Designing for pupils with special educational needs and disabilities in schools, includes sections on the following:
o Key Issues - understanding SEN and access to learning
o Special Educational Needs by type and provision (first page)
o Policy and planning
o Different types of provision
o Project briefing
o Arrival, departure and circulation
o Teaching and learning spaces
o General teaching spaces

- o Outdoor spaces
- o Pupils' toilets, hygiene and changing areas
- o Project planning
- o Typical model schedules

http://www.dfes.gov.uk/consultations/conResults.cfm?consultationId=1335

Building Bulletins 93 (2003) Acoustic design of schools, covers the following areas, the last of which relates to children with disabilities:

1: Specification of acoustic performance
2: Noise control
3: Insulation from external noise
4: The design of rooms for speech
5: The design of rooms for music
6: Acoustic design and equipment for pupils with special hearing requirements

The document also includes descriptions of 10 case studies including two related to children with disabilities:

- A junior school with resource provision for deaf children
- An all-age special school for hearing impaired children.

http://www.teachernet.gov.uk/management/resourcesfinanceandbuilding/schoolbuildings/designguidance/sbenvironmentalhs/acoustics/

The Index for Inclusion http://inclusion.uwe.ac.uk/csie/indexlaunch.htm, developed by the Centre for Studies on Inclusive Education[72], provides helpful guidance on identifying barriers to access.

The Building Bulletin 91 (1999) Access for Disabled People to School Buildings and Building Bulletin 94 (2001) Inclusive School Design provide guidance on carrying out accessibility audits of schools and making schools accessible.

A number of studies have been performed to develop facilities suitable for disabled children written up as case studies[73][74]. The latter describes a participatory study to design new school furniture. After testing standard desks and chairs, a new product was developed with a manufacturer. Feedback indicated a high rate of satisfaction. Special learning environments can also assist students with special needs[75].

In terms of effectiveness of *educational and leisure* facilities, work has been done on the participation of disabled children and how this may be measured[76].

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[72] Centre for Studies on Inclusive Education (2006) Index for inclusion: developing learning and participation in schools, Centre for Studies on Inclusive Education (CSIE), New Redland, Frenchay Campus, Coldharbour Lane, Bristol, BS16 1QU
http://inclusion.uwe.ac.uk/csie/indexlaunch.htm
[73] Gillinson, S. and Green, H. (2006) DEMOS: Beyond Inclusion: It's not just bricks and mortar. Article: 9 August 2006. URL
http://www.demos.co.uk/projects/beyondinclusion/themes/~casestudy
[74] Huwiler, H. and Martens, A. (2006) Development and testing of school furniture suitable for disabled pupils, IEA, 10-14 July 2006, Pikaar, R.N., Koningsveld, E.A.P. and Settels, P.J.M. (Eds.) Elsevier Ltd.
[75] 75 Maguire, M., Elton, E., Osman, Z., Nicolle, C. (2006) "Design of a virtual learning environment for students with special needs", in Human Technology: An Interdisciplinary Journal on Humans in ICT Environments, Special issue on 'Human technology for special needs', Guest Editor Jóse Cañas, April 2006.
http://www.humantechnology.jyu.fi/archives/april06.html
[76] McConachie, H. ET AL. (2006). Participation of disabled children: How should it be characterised and measured? Disability and rehabilitation, September, 28(18); 1157-1164.
file://\\fordgt\intranet\library\pdf\DAR 28 18 1157 Participation of disabled children.pdf

7.2 School buildings in Sweden

Ever since the 1960s, the goal of Swedish disability policy has been to give disabled people the opportunity to live like others. In 1962, children with disabilities were for the first time required to attend compulsory school (120 years after 'universal compulsory attendance' was introduced in Swedish education). The passing years saw the gradual closure of the institutions that until then had provided the only accommodation available to many disabled people. However, it took time for institutional care to be replaced by other forms of public support. Nursing homes for certain groups, including people with learning disabilities, were still operating in the early 1990s.

Most children and adolescents in Sweden attend 'regular' schools, although there are special types of schooling for pupils who are deaf or hearing-impaired, or who have severe mobility or learning disabilities. The Education Act (2000 http://www.sweden.gov.se/sb/d/574/a/21538;jsessionid=aTKOdIuK0-4 states that children in need of special assistance at school are to be provided with it. Also, the law says, there must be equality in education for all children, wherever they may live in Sweden and regardless of any disabilities they may have.

Interestingly, the proportion of people with an upper-secondary education is slightly larger among those with disabilities than among those without. The reverse is true, however, in higher education, although an increasing number of students with disabilities are now finding their way into the country's universities and colleges.

7.3 School buildings in Italy

There are general guidelines concerning the needs of children with some kinds of disability to have access to schools and learning. They are available (in Italian) at:
http://handitecno.indire.it/naviga/content/index.php?action=inizio&id_madre_cnt=2&area=1

8   Teaching services and materials

It is now recognised that children with disabilities have special needs with regard to education. In the UK, for example, the 2001 Special Educational Needs and Disability Act (SENDA, 2001) lays down the foundation for this. An image of the appropriate national flag is presented below each section heading.

8.1   Teaching services in the UK

8.1.1 Policy and support

Removing Barriers to Achievement[77] set out the UK Government's vision for giving children with special educational needs and disabilities the opportunity to succeed, based on SENDA. It built upon earlier proposals for reform of children's services called *Every Child Matters*. One key aim of RBA was to address variation in both practice and outcome across the country. It required organisations involved with providing services to children such as hospitals, schools and voluntary agencies to work together in different ways to protect children and to help them achieve. Every Child Matters set out 5 outcomes for each child:

- Be healthy
- Stay safe
- Enjoy and achieve
- Make a positive contribution
- Achieve economic well-being.

Standard 8 of the National Service Framework (NSF) for Children, Young People and Maternity Services[78], focuses on disabled children and young people and those with complex health needs.
http://www.dh.gov.uk/PolicyAndGuidance/HealthAndSocialCareTopics/ChildrenServices/ChildrenServicesInformation/fs/en. Although the NSF is primarily concerned with health and social care services, its requirement for participation and the active involvement of children and their families in all decisions affecting them also relates well to the educational needs of children.

The Children and Young People's Plan of 2005
http://www.everychildmatters.gov.uk/strategy/planningandcommissioning/cypp/
required local authorities to produce a single strategic overarching plan for all services for children and young people by April 2006. The planning process should focus on the outcomes set out in the government initiative 'Every Child Matters: Change for Children' http://www.everychildmatters.gov.uk/aims/. This is a new approach to the well-being of children and young people from birth to age 19. The Government's aim is for every child, whatever their background or their circumstances, to have the support they need to achieve their potential.

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[77] Department for Education and Skills (2004) Removing barriers to achievement – The Government's strategy for SEN (Special Educational needs). Doc: DfES/0117/2004, DfES Publications, PO Box 5050, Sherwood Park, Annesley, Nottingham NG15 0DJ.
[78] National Health Service (2004) National Service Framework (NSF) for Children, Young People and Maternity Services. Department of Health in England, Richmond House, Whitehall, London SW1.
http://www.dh.gov.uk/PolicyAndGuidance/HealthAndSocialCareTopics/ChildrenServices/ChildrenServicesInformation/fs/en

The Department for Education and Skills provide a range of resources to support the implementation of SENDA. These include teaching materials (resource packs and toolkits), case study information, advisors and networks. These are often provided electronically through the Department's teaching resource website www.teachernet.gov.uk; see for example www.teachernet.gov.uk/wholeschool/sen/ for a resource pack and www.teachernet.gov.uk/wholeschool/sen/updates to subscribe to an electronic newsletter.

To help meet the requirement for education suitable for disabled children, partnerships have been set up. This helps not only to provide better educational support but also takes into account the views of special needs pupils. One example is a partnership between the children's charity Barnardos Yorkshire and Yorkshire and Humberside Local Education Authority (LEA) - see http://www.ourpartnership.org.uk/newspub2/story.cfm?id=351&sid=124

A key role for delivering special education is the SENCO role (Special educational needs co-ordinator). The 1994 Code of Practice for the Identification and Assessment of Special Educational Needs required schools to identify a specialist teacher to co-ordinate provision for pupils with special educational needs (SEN). The British Journal for Learning Support published a special issue on the SENCO role[79]. Topics that were discussed included:

- The importance of valuing and empowering the SENCO role in order to achieve sustainable transformations in education systems. This requires management support.
- The need to establish clear SENCO roles and the responsibilities of Teaching Assistants.
- Integrating special educational needs planning into whole class planning, and creating group educational plans for class teachers to manage can reduce the workload of SENCOs.
- How SEN provision can influence children with behaviour and attendance problems.
- A study of how young people at Key Stage 4 (14-19 years) who had become disconnected from the education system could be included.

In a final article, teachers and lecturers with long and varied experience of special educational needs reflect on their careers involving inclusion and special needs. One concept they promote is the 'capability to function' which changes the focus from lack of capability, to barriers to functioning and how to remove them. The author also looks towards a time when individual differences can truly be something to celebrate rather than correct.

8.1.2 Individual education plans

In the UK individual education plans (IEPs) are required for children on the 'special needs register'. This is a personalised programme of work to tackle that particular child's needs. These might be for literacy, numeracy, behaviour, etc. IEPs in the UK are developed using the following stages:

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[79] British Journal for Learning Support (2005) Special issue: Aspects of the role of special educational needs co-ordinator, Publisher: National Association for Special educational Needs, 20, 2, May 2005, ISSN 0268 2141.

- *Information Gathering (including Identification, consultation and assessment):* IEP required where differentiated approach is not successful; 'adequate progress' a general criterion for decisions on approach; teacher's professional judgement; parent and pupil involvement.

- *IEP Team (Students involved 'as appropriate' in all cases):* Teachers, parents and pupils work together. If necessary - LEA support services, health/social service professionals; varying roles and involvement for SENCOs (Information for Special Needs Co-ordinators), depending on different schools and levels of needs. Guidance is available from local councils e.g. for Nottingham City Council: http://www.nottinghamschools.co.uk/eduweb/schools/schools-template.aspx?id=1210

- *Planning / Design:* Identify additional provision; specific teaching strategies; short-term learning targets; criteria for success and/or exit; SMART objectives; realistic timeframes; date for review.

- *Implementation /Management:* Implemented as agreed; stick to timeframes; IEPs considered in context of overall class management; teachers plan IEP time in weekly /daily plans; SENCO role in overall school management of IEPs; all contact staff aware of individual IEPs.

- *Review:* Continuous monitoring/ review; success and progress evaluated formally at least twice a year – more frequent if necessary, depending on age, individual needs and provision; 'adequate progress' a general criterion considered.

Contact was made with John Hall in the SEN Adviser Team, Special Educational Needs and Disability Division, of the Department for Education and Skills. His team have been asked for the minimum guidance needed to meet the requirements of SENDA. A resource for local authorities has been produced which includes case studies from schools[80].

8.2   Teaching services in Ireland

The right to education in Ireland is recognised under Article 42 of the Constitution. However, in 1993 the Special Education Review Committee (SERC) reported that *"Ireland has a conspicuous lack of legislation governing much of educational provision but particularly covering education provision for students with special needs."* This was initially addressed with the passing of the Education Act 1998. A stated objective of this Act was *"to give practical effect to the constitutional rights of children, including children who have a disability."* The Act further stated that support services and a level of education *"appropriate to meeting the needs and abilities"* of students should be provided for. The Education for People with Special Educational Needs (EPSEN) Act 2004 provides the statutory requirements for educational planning as they impact upon students, parents, schools, and the National Council for Special Education (the Council). However, with

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[80] Department for Education and Skills (2006b) Implementing the Disability Discrimination Act in schools in the early years. In collaboration with the Disability Rights Commission. DfES publications, PO Box 5050, Sherwood park, Annesley, Nottingham NG15 0DJ. Ref: 0160-2006DEC-EN. Written guidance contained in this resource pack can be downloaded at: http://publications.teachernet.gov.uk by searching on appropriate keywords.

the legislation only recently enacted, much of the detail remains to be finalised (e.g. the format of written plans and reports) and this will be done over time as the Council assumes its powers and responsibilities.

In July 2005, the National Disability Authority in Ireland published research examining the international experience in the provision of IEPs (Individual Education Plans) for children with disabilities[81] http://www.nda.ie/cntmgmtnew.nsf/cntmgmtnew.nsf/0/393FEBD9B935DE018025706 60054EC18?OpenDocument. The review compared approaches in Queensland, Australia, British Columbia in Canada, New Zealand, the United Kingdom and the United States. A table summarising international practice is given in: http://www.nda.ie/cntmgmtnew.nsf/0/B2EC95D13D596319802570660053BE2A?Ope nDocument.
Some of the key issues that emerged when policy is put into practice are explored with an examination of the research literature. The report also makes recommendations which may be applied to the emerging system in Ireland. Some general recommendations are:

- Parents and students should be included to the fullest extent possible at all times.
- There should be a shared responsibility for planning and collective accountability for outcomes amongst members of the IEP (Individual Educational Plan) team.
- There should be a consensus on educational and other goals.
- Socialisation and behavioural contexts, priorities and targets should be central elements of each child's plan. Inclusion within peer groups can become more of a barrier to educational inclusion in mainstream settings as students move beyond primary level.

8.3   Teaching services in Sweden

The Swedish Institute for Special Needs Education (Specialpedagogiska Institutet) coordinates state support in this educational field. Its primary task is to advise the bodies responsible for the country's pre-schools and schools. The Institute also develops special-needs educational materials for people working with children, adolescents and adults with disabilities. All of its measures are aimed at enhancing the expertise of those working in the municipalities, so that children, adolescents and adults with disabilities are allowed to develop and participate in an education equivalent to others in the home municipality. The task is to provide support to those responsible for special needs education in government operated schools and independent schools under central supervision. The Institute does this by distributing information and providing knowledge about special needs education, and by initiating and participating in developmental work in this field. The national resource centres conduct assessment and training of individual children and adolescents. The resource centres also offer information and training to parents, teachers and other staff. An important part of the work is to adapt and develop educational materials for special needs education.

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[81] National Disability Authority (2005b) International Experience in the Provision of Individual Education Plans for Children with Disabilities. National Disability Authority, 25 Clyde Road, Dublin 4, Ireland.
http://www.nda.ie/cntmgmtnew.nsf/cntmgmtnew.nsf/0/393FEBD9B935DE01802570660054E C18?OpenDocument

8.4   Teaching services in Slovenia

A UNICEF report by Ainscow and Haile-Giorgis[82] discussed progress towards inclusion within schools in the Czech Republic, Hungary, Slovakia, Poland, Slovenia, Romania, Latvia and Lithuania. The report states that there are certainly moves towards the integration of children with disabilities in all of these countries. In Slovenia there have been significant moves to integrate children with special needs into mainstream schools, including into regular classrooms. The number of children in special schools in 1996[83] had fallen by one-quarter and their share of total basic school enrolment in that year was 1.5% although provision was reported to be uneven across the country. Slovenia has also opted to adopt aspects of the British educational system with its two-tier exam system and a sequence of staged attainments.

Trtnik Herlec's[84] paper at ISEC 2000 on inclusion within schools in Slovenia (http://www.isec2000.org.uk/abstracts/papers_t/trtnik_herlec_1.htm) reported that following UNESCO's Salamanca statement on education for all, Education Acts were passed in Slovenia which included articles specifying children with special needs, the parents' right to choose the school, the school's duty to adapt the teaching process and equipment for them, and various educational programmes for them. The author analyses the process of change towards more inclusive school cultures. It occurs on four levels: individual, organisational, sector and national. The implications for head teacher training and school-based whole staff seminars and workshops are discussed at these levels, and the role of the National Leadership School explained. The paper also deals with the question of how the special educators could contribute to the development of effective inclusive education through the continuing professional development of teachers and heads.

8.5   Teaching research in Italy

The following input was provided by SIVA (Servizio Informazioni e Valutazione Ausili) at University of Valle d'Aosta in Milan. They reported that research has been carried out into play for children with motor impairment. The first phase of this research had the objectives of finding the needs of this population in terms of both usability and accessibility of toys[85][86][87][88]. A

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[82] Ainscow, M. and Haile-Giorgis, M (1998) The Education of Children with Special Needs: Barriers and Opportunities in Central and Eastern Europe. Innocenti Occasional Papers, Economic and Social Series, No. 67. Florence: UNICEF International Child Development Centre. www.ied.edu.hk/csnsie/info/res2.pdf

[83] United Nations Children's Fund (1996) Situational analysis of the position of children and families in Slovenia, Ljubljana: Slovenian Committee for UNICEF.

[84] Trtnik Herlec, A. (2000) Inclusion in Slovenia after the implementation of the new legislation, Proceedings of International Special Education Congress (ISEC 2000), University of Manchester, UK. http://www.isec2000.org.uk/abstracts/papers_t/trtnik_herlec_1.htm

[85] Besio, S. (2004) Using Assistive Technologies to Facilitate Play by Children with Motor Impairments: A Methodological Proposal, Technology & Disability, 16(3), 119-130.

[86] Besio, S. (2003) They play and learn to play! First results of the Italian research project on play and children with motor impairment, in: G.M. Craddock et al. (Eds.). Assistive Technology. Shaping the Future. Atti del Congresso AAATE Dublin, 30 August– 3 September 2003.

[87] Besio, S. (2002) An Italian research project to study the play of children with motor disabilities: the first year of activity, «Disability and Rehabilitation», 24, n. 1-3 January-February 2002 72-79.

European Consortium has been set up with the intention to go on with these studies (play and children with disabilities).

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[88] Besio, S. (2001) Allowing children with motor impairment to play, learn, learn to play. A new Biennial Research Project of SIVA, Italy, in: Marin et al. (Eds.), 2001, Assistive Technology - Added Value to the Quality of Life, Amsterdam: IOS Press, Proceedings of AAATE 2001 Conference (Association for the Advancement of Assistive Technology in Europe), Ljubljana (Slovenia), 3-6 September 2001, 453-458.

9   Playgrounds and play areas

The right to play is recognised as a human right in the UN convention on the Rights of the Child and there is a growing recognition that playgrounds should be safer and more inclusive for children of different abilities. New playgrounds tend to have soft tarmac surfaces so that the risk of head or other serious injury if a child falls off play equipment is reduced. There may also be signs or surfaces where children with a visual impairment can use their senses. The figure below, for example, shows letters and images in a contoured form which can be felt by touch. Pictures of animals are also shown with their names in alphabetic and Braille form.

Figure 6: Multi-modal displays attached to a slide in a playground area in Loughborough, England. This example shows on one display, the letters of the alphabet as recessed characters which can be seen and detected by touch. The display below shows the images of three pet animals (dog, mouse, cat) with the names also presented as recessed letters and with Braille equivalent letters alongside.

9.1 Playgrounds standards work item

In 2005, during one of the meetings of Working Group CEN/TC 136 SC1 'Playground equipment for children, Germany proposed a new Work Item concerning barrier-free playground equipment, to be dealt with as separate part of EN 1176, the European standard for playground equipment[89]. This covers the following topics:

- Safety requirements
  - General requirements
  - Movement in areas containing equipment
  - Movement in areas outside the equipment
  - Orientation aids
- Materials
- Design
- Structural integrity
- Accessibility for assistance
  - Surface types
  - Falling space
- Requirements specific to equipment
  - Swings
  - Slides
  - Carousels
  - Rail-mounted equipment
  - Rocking equipment
- Testing
- Information to be provided by the manufacturer or supplier

The CEN Working Group TC 136 SC1 passed a resolution to look further at the document in September 2006 and consider as a first stage the title, scope and target dates for development of the document.

Contact has been made and further discussion is to take place with the chair person of the working group to obtain an update on any recent development relating to the Work Item. A short addendum to this report will be issued of these developments.

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[89] CEN/TC 136 SC1 (2005) Barrier-free playground equipment – Safety requirements and test methods, European Standard Work Item, Prepared by the Technical Committee AA14.7." Barrier-free playground equipment", of the Standard Committee "Sports, playground and other recreational equipment" within the DIN German Standards Organisation.

9.2 Playgrounds in the UK

In light of the UK's Disability Discrimination Act (DDA, 1995) guidelines have been issued by various bodies regarding inclusivity in playground provision for children and adult carers with disabilities.
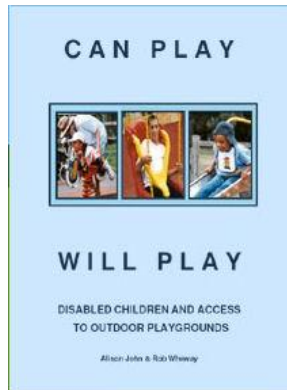
The National Playing Fields Association (NPFA) commissioned a report on disabled children and access to outdoor playgrounds[90] http://www.npfa.co.uk/content/playforchildren/index.html. The result is a good narrative document that informs bodies, such as local authorities, concerned with accessible play areas. The report gives advice to assist playground managers in meeting the needs of the UK Disability Discrimination Act (DDA) 1995, the benefits of inclusive play integrating children with disability and able-bodied children and, crucially that play should be 'for itself', rather than treatment, educational trips or other purposes.

The document also makes the point that having one hundred percent accessible playgrounds is not possible.

Figure 7: Front cover of the National Playing Fields Association's guidelines document on inclusive playgrounds

Disabled children have a wide variety of needs and so satisfying the needs of one group of children may make a playground inaccessible to others. It gives some examples of what are reasonable adjustments and what are not.

The document argues that making playgrounds accessible is often about overcoming parental fears about bullying of disabled children and that they offer a means for parents of disabled children to meet, build relationships and share experiences in a way that may not be so easy when travelling distances with their children to special schools. It recommends that playground managers should actively seek out the views of disabled children and their parents. Other issues that are covered are that disabled children should be allowed to get dirty, and that a 'can do' approach is taken in allowing children to play freely while taking regard of health and safety concerns. It also discusses the value of 'local' playgrounds where disabled children can visit more informally alongside the central 'visit' playground which may have lots of good facilities and equipment but requires a greater level of parental involvement in transporting the child and overseeing them.

The report takes the view that an accessible playground is one in which disabled children are freely able to play with their friends of whatever ability. They therefore concentrate on achieving this for all disability groups without concentrating on specific equipment. The report also makes the point that not all disabled children have physical impairments. For example, children with autism are very able in agility terms but are unaware of the dangers of running away from a playground, or across a road. For these children an accessible playground is one at which the gates can be closed with latches that are out of reach. The parent or carer can then leave them to play freely. However closed gates with out of reach locks would make the

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[90] John, A. and Wheway, R. (2004) Can play will play, The National Playing Fields Association (NPFA), St. Chad's Place, London WC1X 9HH
http://www.npfa.co.uk/content/playforchildren/index.html

playground inaccessible for a child or adult carer in a wheelchair or a small child, while bullies could also trap young children inside.

The report emphasises the need for children to freely choose if they want to play and not to be forced into it by adults who are watching. In order to adapt existing playgrounds, the document gives recommendations on providing:
- Paths for wheelchairs
- Reasonably obvious accessible entrances
- Drop kerbs at the pavement near the playground entrance
- A bench with a back rest
- Bright or contrasting colours to indicate changes in ground level
- Easy access by removing steps, styles, kissing gates or dog grids that restrict wheelchair users and children with motor impairments.
- Loose fill impact absorbing surfaces
- Support (back rest, handrail or footrest) on rocking items
- Wide slides allow some children to be supported by an adult although they also allow a child to rotate in descent which is not ideal.
- Swinging items which children can lie on, a deck roundabout or giant revolving disc roundabout.

A further document has been produced by the Office of the Deputy Prime Minister on Accessible playgrounds[91] http://www.communities.gov.uk/pub/763/DevelopingaccessibleplayspaceagoodpracticeguidePDF766Kb_id1127763.pdf.

Figure 8: Cover page of the guidelines document on accessible play space from the UK Office of the Deputy Prime Minister

The document covers introductory subjects such as understanding disability and impairment, the importance of play, and the impact of sustainable and inclusive communities. It then gives advice to local authorities to carry out a review of play spaces covering both the social and the technical and physical issues. Reviewing social issues involves thinking about how to create opportunities for disabled and non-disabled children to play together. A focus on technical and physical characteristics involves considering such issues as safety and maintenance, car parking, shelter and toilets. In carrying out a review, one local authority worker, for instance, presented councillors with photographs of all playgrounds in the area, showing states of disrepair and neglect. This led to the development of a new strategy and rolling programme of play space improvement.

The report then discusses the process of consulting and engaging disabled children and their families, reinforcing the approach suggested in the NPFA document. It stresses the value of creative thinking to maximise the benefits of this consultation programme and to consider ways to obtain input without taking up too much hard-pressed family time.

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[91] Office of the Deputy Prime Minister (2003) Developing accessible play space, Office of the Deputy Prime Minister (ODPM). Product code: 03UPU01737. Available from ODPM Publications, PO Box 236, Wetherby, West Yorkshire, LS23 7NB. (odpm@twoten.press.net) http://www.communities.gov.uk/pub/763/DevelopingaccessibleplayspaceagoodpracticeguidePDF766Kb_id1127763.pdf

A chapter on Inclusion by Design covers the topics: equipment, surfacing, space, sculpture and art, natural resources (e.g. logs), scented plants etc. The document makes many relevant points in relation to children with disabilities:

- Equipment plays an important part in a playground but children will want to do other things than use equipment, particularly children with disabilities who may be unable to use some items of equipment. Well designed play spaces should offer contrasting play opportunities to increase access.
- Water play equipment involving no standing water offers safe opportunities for widening children's access to play in open public spaces.
- Regarding surfacing, while soft wheelchair and buggy accessible surfacing is desirable, its uniform use can reduce the sensory experience. Use of bark, pebbles, chippings, stones and other small materials widen the sensory experience but can inhibit wheelchair access.
- Space around equipment is important to allow children using wheelchairs to manoeuvre around equipment and to allow children to simply wander around the play area. Opportunities for playing without joining in can help some children with cognitive impairments to be included in play spaces more easily.
- Play areas aren't just about equipment. Surrounding areas, landscape and surfaces below the equipment can be just as important and offer contrasting play opportunities to increase access.
- Equipment that is hard for an individual child to use but which could be accessed with the help of a brother, sister or friend gives opportunities for social interaction.

The chapter also discusses safety and that children need and want to take risks when they play. The document states that taking risk is an integral part of play and cannot be eliminated from accessible play. Play provision therefore aims to manage risk so that children are not exposed to unacceptable risks of injury. It gives the example that having 'easy open' gates can facilitate access for wheelchair users but create a point of danger for children with learning difficulties or toddlers. One answer is to use well designed accessible latches on gates rather than push or pull self-closing gates.

Design for families is also covered and suggestions are offered for providing shelters for adults and disabled children to stand in if it rains or for wheelchairs. A nearby café is also a popular feature of top-rated play spaces. Provision of safe and warm places for children and young people with medical needs can vastly improve accessibility, as well as storage facilities for medical equipment such as nebulisers, oxygen cylinders, tube feeding equipment or bulky changing bags. Provision of transport and parking facilities should also be considered, as failure to consider these aspects may mean that parents with disabled children cannot access the play space.

Signs and notices can also make a big difference in welcoming children and their families into public play spaces; feeling welcome adds to accessibility.

Further parts of the document provide a framework to help develop accessible play spaces, gives thinking points, suggested actions and examples, discusses funding issues and provides a list of further resources.

9.3 *Playgrounds in Sweden*

Contact with Handisam in Sweden identified two documents relating to playgrounds.

This publication about playgrounds for children with disabilities was produced by Sveriges Kommuner och Landsting, the Swedish Association of Local Authorities (SALA) and the Federation of Swedish County Councils (see www.skl.se).

Figure 9: Cover page of the Swedish Association of Local Authorities' guidelines on playgrounds for children with disabilities

A second publication is also concerned with playgrounds for everyone and can be downloaded from the Website www.skl.se. This was prepared by the local government City of Stockholm.
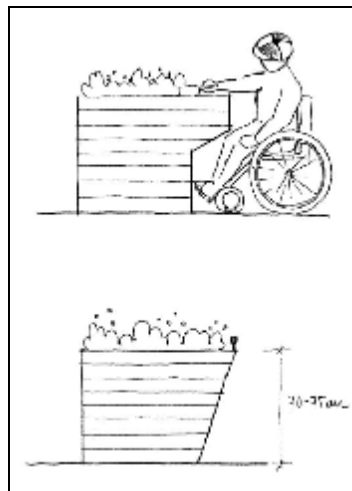
Figure 10: Pages from the City of Stockholm guidelines on playgrounds for everyone. The left hand page shows two children, one in a wheelchair. The right hand picture shows a child wheelchair user using an activity play surface raised to a convenient height (70 to 75cm)

9.4 *Playgrounds in Finland*

In Finland there is widespread interest in disabled adults and carers being able to partake in playground use cooperatively with accompanying children. This is supported by the efforts of the Finnish Company Lappsett who are seeking to provide opportunities for inter-generational play by producing appropriate playground equipment and furniture. This is resulting in new playgrounds being constructed to meet the needs of disabled users (e.g. by providing hand rails

and supplementing ladders with gentle ramps) thereby also increasing their physical accessibility to older adults who may accompany disabled children.

Lappsett use wood in making play equipment as an alternative to the conventional tubular metal style playing apparatus, to provide a softer, warmer playing environment (http://www.lappset.com/company/1_2.asp). This might be helpful for children with disabilities in particular as it could potentially allow them to indulge in more natural play rather than being over protected. The Roundpole project funded by the European Union Northern Periphery Program aims to increase the usage of small dimensioned roundwood in countries involved in the project. The justification for this is the need to encourage forest thinning and more value added uses of small dimensional timber in general.

Figure 11: Image of wooden playground equipment taken from the European Union's Roundpole project showing two connected slides and accompanying ladders

According to the Roundpole project web pages: http://www.gaiagroup.org/Research/RI/PAS/roundpole/play/play.htm, new regulations on wooden play equipment means that designs must comply with European legislation which limit hazards associated with trapping fingers and picking up splinters, etc. This will mean that 'roundpole' for use in play equipment will need to be either very carefully selected or machined to get rid of the uneven parts of the timber. The avoidance of CCA (chromated copper arsenate) wood preservative treatment in children's play equipment is being led by Lappsett.

9.5   *Playground initiative in Denmark*

A new accessible public playground has been constructed in the south-eastern part of Copenhagen which provides a good example for other countries. The 4,000 square metre area has been inspired by a Norwegian fairytale about a prince, who has been transformed into a gigantic polar bear and a poor girl, who set out on a dangerous journey. She has to endure many challenges, before she manages to save the prince. On her way she meets fantastic fairytale figures http://www.design-for-all.org/artikel.php?ac=direct&id=2473#id2473.

Figure 12: Image from 'East of the Sun and West of the Moon' an extensive accessible playground in Copenhagen. This shows children navigating a simple maze painted on the ground

The design includes fairytale figures and unique play equipment of granite and tree trunks formed into fairytale figures and unique play equipment. All the sculptures are there to be looked at, touched, climbed on or be lifted onto.

From the beginning of the design process accessibility was given a high priority.

There are winding paths up and down the hillocks with different degrees of slopes, which give the children different challenges. If a child can't get up and down the steepest path they can choose the slightly less steep path. The path kerbs keep wheelchair-users and visually impaired children "on the right path".

There is a special path with different obstacles for the children to master. Here they can climb, crawl or jump from one obstacle to another and develop their gross motor skills. At the same time the path provides many tactile experiences, muscles are strengthened and fine motor skills refined by means of catching, letting go, adjusting the feet and experiencing different kinds of surfaces. Experiences of different materials, different smells and colours give identity to this special path.

For physically disabled children the obstacle path provides a challenge for them to pull themselves forward on their stomachs if their legs are paralysed or weak to develop their arm strength.

Although the place is designed to meet the needs of disabled children, it gives challenges to able children as well. The unique equipment has different functions and can be used in many different ways.

The National Committee for the Handicapped 2003 supported the production of a leaflet, which was sent out to all the 270 counties in Denmark to inspire and encourage everyone to think about how playgrounds in the future throughout Denmark can be accessible to every child.

10 Group activities

Many bodies such as public libraries, hotels and churches will run group activities for children. The challenge is how to include children with disabilities into such activities. General advice is available from the church group 'Through the Roof' at http://www.throughtheroof.org/roofbreakerguides/rbg_5.html#content. This advice, which could apply to all kinds of group activity, includes:

- Make time to talk to the parents, who will know what their child's needs are and how best to meet those needs.
- Many disabled children need a one-to-one helper. This will reassure parents that their child's needs will be met by one person with whom they can discuss issues of concern, and also takes pressure off the group leader who can rely on the helper to meet the needs of the child.
- Find members of the organisation who would be prepared to act as a one-to-one helper but may not feel able to teach in a children's group. If necessary, the one-to-one helper can simplify or repeat a story, use a worksheet adapted to include a drawing rather than text, or write in the child's ideas rather than expecting them to do it themselves.
- If you are welcoming a new disabled child into the group, it is often a good idea to ask a parent to visit the class the previous week and explain to other children about their disabled child and give them the knowledge and confidence to welcome the child.
- Remember that for a child with severe difficulties, their inclusion in the group may be their first experience of being in a mixed group - this can be a little daunting but also a very positive experience for the child and the others in the group.
- Allow disabled children to dictate the pace. They are often realistic that it is not always possible to include them in everything, but are always happy to feel part of the group
- Try to include disabled children by giving them tasks appropriate to their abilities; for example, giving out books, keeping score in a game etc. This will help them to feel less frustrated
- Be creative! To keep their attention, use plenty of variety, different visual stimuli (unless their problem is visual impairment!), lots of description, action songs and games
- Work at helping others in the group to feel comfortable and safe with the disabled child or children and so demonstrate acceptance
- Use teaching to emphasise that everyone is different and that everyone is special.
- If the child is confident enough, encourage them to talk to the others about their disability and how they feel about it.
- Give them the opportunity to say the things they find difficult, which will probably be the attitudes and misunderstandings of others.

11 Public transport

11.1 European Commission initiatives

The EC has campaigned and made proposals for regulations to assist people with disabilities in gaining access to public transport vehicles and facilities[92] http://www.edf-feph.org/en/policy/transport/trans_pol_co.htm

11.1.1 Air travel

In February 2005 the European Commission tabled a proposal for a Regulation on the rights of passengers with reduced mobility when travelling by air which will prohibit discrimination against disabled air passengers. This proposal, once it is adopted by the European Parliament and the Council of the European Union will make a big difference to the lives of disabled people. (A Regulation is a legal instrument of the European Community which has direct legal effect in member states without further enactment.)

The proposed regulation would:
- prohibit refusal of booking or refusal of carriage to disabled persons because of their disability;
- prohibit charging disabled passengers for the assistance they need
- ensure the provision of high levels of assistance for disabled passengers
- establish a centralised charging system - the managing body of an airport will provide assistance free of charge to disabled passengers
- ensure costs of the centralised system will be covered by airlines who will pay an amount proportional to the number of passengers they carry (all passengers, not just disabled passengers)
- require quality standards to be set by the managing body of the airport in conjunction with airport users' committee
- require mechanisms for complaints, sanctions and enforcement.

11.1.2 Buses and coaches

Following a long battle over many years by the European Disability Forum (EDF) together with the 'Buses for All' Campaign, a positive final decision was made with the Council of the European Union to secure mandatory access provisions to urban buses in the EU Directive on Buses and Coaches. A crucial success was negotiated, with the support of the European Parliament to secure provisions for the mandatory fitting of ramps or lifts to all urban buses operating in the EU. The Directive also includes provisions such as the requirement for priority seating for persons with reduced mobility, space for a guide dog in the vehicle and provisions for colour contrast for visually impaired persons. The Directive has now finally been published and Member States were required to implement the terms of the Directive by 13 February 2004.

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[92] European Disability Forum (2005) Transport policy issues: Disability rights take off with commission proposal. Discrimination against disabled air passengers to be illegal in Europe. European Disability Forum, Rue du Commerce 39-41, B-1000 Brussels, Belgium. www.edf-feph.org/en/policy/transport/trans_pol_co.htm (updated 18 February 2005)

11.1.3 Railways

EDF has been actively involved in the follow-up work undertaken by the EU since the adoption of the package of EU Directives on Rail which includes specific requirements on access for persons with disabilities. EDF presented its position at a Hearing on rail passenger services organised by the European Commission and responded to a questionnaire on this subject as part of the European Commission consultation process calling for implementation of the results COST 335 study on "passengers' accessibility of heavy rail systems".

11.1.4 Maritime transport

People with reduced mobility are still very often confronted with barriers in maritime transport. These barriers include safety problems as well as accessibility issues. The needs of people with reduced mobility have been addressed in some chapters of the recently adopted European Commission White Paper on Transport http://www.euractiv.com/en/transport/white-paper-transport/article-129628. The European Commission wishes to improve the Directive 98/18/EC on safety rules and standards for passenger ships to address, amongst other things, the issue of accessibility for people with reduced mobility. The aim is to secure disabled passengers' safety at the same level as other passengers which would include a guarantee of accessibility, a timetable for compliance and a detailed technical annex along the same line as the recently adopted "Bus and Coach Directive".

11.1.5 Trans European Network Review

The Community guidelines for the development of the Trans European Transport Network (TENS) were adopted in 1996. These guidelines cover all transport modes (air, rail, bus and coach and cars). The general aim is to establish, by 2010, the gradual integration of all modes of transport by land, sea and air across the EC. The specific objectives are:

- to provide a framework for Community financing relating to the development of the Network.
- to ensure sustainable mobility of persons and goods across the EC under the best possible social and safety conditions.
- the implementation of studies to improve the design and better implementation of TENS.

11.2 Transport in the UK

11.2.1 Disability Discrimination Act

The UK Disability Discrimination Act (1995)[93] http://www.opsi.gov.uk/acts/acts1995/1995050.htm allowed the UK Government to set minimum standards so that disabled people can use public transport easily. In April 2005 a new Disability Discrimination Act was passed by the UK Parliament, which amended or extended existing provisions in the 1995 Act. The 2005 Act contains many transport provisions and, for example, makes it unlawful for operators of transport vehicles to discriminate against disabled people. See http://www.direct.gov.uk/DisabledPeople/RightsAndObligations/YourRights/YourRightsArticles/fs/en?CONTENT_ID=4001068&chk=eazXEG

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[93] Disability Discrimination Act (1995, 2005) The Disability Discrimination Act (DDA), Office of Public Sector Information (OPSI), St. Clements House. 2-16 Colgate. Norwich, NR3 1BQ, UK.

11.2.2 Contact with UK Government Departments

The following information was provided by contacts at the Department for Transport and the Department for Work and Pensions:

A revised code to the Disability Discrimination Act came into force on the 4 December 2006 (see Code of Practice - Rights of Access: services to the public, public authority functions, private clubs and premises). A transport supplement to this code has been produced. See below for more information and also documents at:
(1) http://www.dft.gov.uk/stellent/groups/dft_mobility/documents/page/dft_mobility_033702.hcsp and
(2) http://www.drc-gb.org/library/publications/services_and_transport/code_of_practice_rights_of_ac.aspx

Although transport infrastructure is covered by the Part 3 duties (Access to goods, facilities, services and premises), it was decided at the time that the DDA was going through Parliament that simply giving disabled people 'rights' in respect of public transport would not deliver the effective and sustainable transport solutions needed. For that reason, Part 5 (Transport) was introduced into the Act to enable detailed technical requirements to be made for trains, taxis, buses and coaches. This meant that the Government could specify dimensions that were known to meet the needs of disabled people which could be applied consistently to all land-based transport modes.

However, the wording of the exemption (at section 19(5)(b) of the DDA) had the unintended effect of excluding transport services in their entirety from the Part 3 duties. The DDA 2005 has clarified that exemption (that it only applies to the provision and use of a vehicle) and allows that exemption to be removed for different vehicles at different times and to differing extents.

The disability discrimination regulations for Public Transport (Disability Discrimination Act, 2005) http://www.opsi.gov.uk/acts/acts1995/1995050.htm cover all land-based public transport (trains, buses, coaches, taxis and private hire vehicles) as well as vehicle hire and breakdown services. They do not therefore cover aircraft nor sea-travel. In recognition of the specific provisions of Part 5 of the DDA (see below), the duties to make physical adjustments will only be applied to the vehicle hire sector. More information about the application of Part 3 to transport services can be found in the Disability Rights Commission's Code of Practice Disability Rights Commission (2006)[94] http://www.drc-gb.org/library/publications/services_and_transport/provision_and_use_of_transport.aspx.

The Transport Code (2006)[95] http://www.opsi.gov.uk/si/si2006/20061094.htm is a supplement to the Part 3 general code of practice mentioned above and should be read in conjunction with that publication.

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[94] Disability Rights Commission (2006) Code of Practice: Provision and use of transport vehicles, DRC Helpline, FREEPOST MID02164, Stratford upon Avon, CV37 9BR. http://www.drc-gb.org/library/publications/services_and_transport/provision_and_use_of_transport.aspx
[95] Department for Transport (2006) Statutory Instrument 2006 No. 1094, The Disability Discrimination Code of Practice (Supplement to Part 3 Code of Practice) (Provision and Use

The Government has powers in Part 5 of the DDA to make regulations requiring all land based public transport vehicles to be accessible to disabled people, including wheelchair users. The DfT have already introduced regulations requiring all new trains (since end 1998) and buses and coaches used on local and scheduled services (since end 2000) to be accessible, and proposals for taxis are under development. Links to all associated legislation are available at the DfT web site:
www.dft.gov.uk/stellent/groups/dft_mobility/documents/page/dft_mobility_033702.hcsp

More information on what is being done for specific forms of transport, including aviation and shipping, which are currently outside the scope of the DDA, can be found at www.dft.gov.uk/access.

11.2.3 Contact with the UK's Disabled Persons Transport Advisory Committee (DPTAC)

Contact was made with the UK's Disabled Persons Transport Advisory Committee (DPTAC). This body was established by an Act of Parliament as an independent body to advise Government on the transport needs of all disabled people across the UK. The view was expressed that standards for disabled people are expected to be inclusive of both adults and children. For example recommendations for wheelchair spaces and handrails should support both groups. However for transport related specifically to children such as school buses, then specific recommendations for children are needed.

It was also stressed that all recommendations for UK official guidance should be evidence based rather than just based on the opinions of experts. For example, the Department of Transport has published recent research on wheelchairs which shows that the standard size needs to be bigger to meet the needs of an adult (and possibly older child) population with growing physical dimensions. This clearly has space implications for the carriage of wheelchairs on public transport.

Differences between the standards in different countries are revealed when trying to agree standards for the Trans European Rail services. Understandably countries with the more stringent standards may be unwilling to lower them.

DPTAC have also released a guide to good practice for real-time information system providers to meet the needs of disabled travellers[96] http://home.btconnect.com/centaurconsult/rtig/Documents/RTIanddisabledtravellers.pdf. The guidelines are intended to make service information about what is running, where it goes, whether it is on time, accessible to those with sensory and learning difficulties. The guidelines, which have relevance to older children as well as adults, covers:
- Font and format of information
- Refreshed and scrolling text
- Sign finish, contrast and borders
- Sign positioning, lighting and environment

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of Transport Vehicles) (Appointed Day) Order 2006. Available from:
http://www.opsi.gov.uk/si/si2006/20061094.htm
[96] Disabled Persons Transport Advisory Committee (2006) Meeting the needs of disabled travellers A guide to good practice for real-time information systems providers RTIG Library Reference: RTIGPR003-D002-1.1 June 2006
http://home.btconnect.com/centaurconsult/rtig/Documents/RTIanddisabledtravellers.pdf

- Provision for audible information, messages and announcements
- Audio systems
- Hearing enhancement
- Triggering audio assistance
- Synthesised speech
- Tactile information
- Information provision via websites and mobile phones.

By providing information in a generalised form, this makes it applicable to many different transport situations and environments.

11.2.4   Department for Transport guidance

The Department for Transport have produced a best practice guide to inclusive mobility for pedestrian and transport infrastructure[97]. This includes a small number of references to children (although not disabled children). These references include:

- Those travelling with small children, carrying heavy luggage or shopping, people with temporary accident injuries and older people can all benefit from good design for pedestrian and transport environment.
- Guardrails should be designed to prevent guide dogs from walking under the rails, but leaving sufficient openings between vertical members to ensure that children and wheelchair users can see, and be seen, through the railings.
- Second lower handrails for children and people of restricted growth are helpful and should be at heights of between 550 and 650mm.
- In seating and waiting areas, if space permits, it is helpful for people of restricted growth and children if there are some seats at a lower level than the standard height. Also in designing the layout of the seats, space should be left for wheelchair users to sit with their companions.
- Urinals should include one stall with a lower rim (maximum 430mm from the floor) for use by people of restricted growth and children. At this urinal there should be a vertical rail on both sides to assist people who only have the use of one or other side of their body. A similar rail should be provided at the side of at least one standard height urinal.

11.2.5   General issues on access to public transport

Whitney (2006)[98] has developed a document to support literature searching on the provision of information to disabled people to enable them to travel successfully, with ease and confidence on road based public transport (long distance buses, local buses, minibuses, trams and door to door services). Whitney describes traveller needs in terms of different kinds of disability.

- *Physical disabilities* include limitations in movement, dexterity, strength and endurance, manipulation and voice, Whitney identifies the need for low steps or ramps, handrails, sufficient time to get to the door or seat, seats/rests at stops, easy to use door handles and tickets machines, and alternative communications methods.
- *Relevant sensory disabilities* cover sight, hearing and balance. Travellers with these disabilities require information provided in a range of different media, visual and audible pre-journey and journey information, colour contrast on steps and handrails, tactile surfaces to indicate shops, etc.

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[97] Department for Transport (2005) Inclusive mobility: A guide to best practice on access to pedestrian and transport infrastructure. Published: 1 November 2002. Updated: 13 July 2005. http://www.dft.gov.uk/stellent/groups/dft_mobility/documents/page/dft_mobility_503282.hcsp
[98] Whitney, G. (2006) Accessible road-based public transport information in the developed world, 18 July 2006, Middlesex University, UK.

- *Cognitive disabilities* relate to intellect, memory and language or literacy. Here there is a need for standardisation in design and practice, and a requirement for both textual and non-textual signage.
- *Multiple disabilities* require a consideration of the effects possible combinations of disability.

In terms of specific topics, the following will apply to children with disabilities:
- Facilities at bus/tram stations (café, toilets, help points, etc.)
- Facilities at bus stops (seats, shelters)
- Vehicle accessibility

Older children may require accessible transport information on routes, fares and discounts, payment information, stop locations, vehicle arrival information, confirmation of correct vehicle, destination arrival, what to do to get the vehicle to stop, use of local or colloquial names of destinations, ongoing travel information. Whitney also lists different techniques for making travel information accessible using the principle of redundancy, font/layout/colour contrast/brightness, non-textual visual information, tactile information, and volume frequency and repetition of visual audible information.

Finally Whitney raises specific issues such as how will transport disruption information be transmitted, what services should be provided during periods of high congestion or poor weather conditions, how all the transport aspects will be managed including training for staff in how to assist disabled passengers and for the passengers themselves.

11.2.6   Child restraints

Advice was sought from ESRI colleagues regarding child seats within vehicles and whether designs were adapted for children with special needs. The company Britax www.britax.co.uk produce child seats for disabled children for use in both car and buses or coaches. They took advice from Scope (for People with Disabilities) http://www.scope.org.uk/, The Association for Spina Bifida and Hydrocephalus, the Wolfson Centre, Chailey Heritage and the Disabled Living Foundation. Characteristics of their seats for children with disabilities include:
- Convenient, easy installation using an adult lap and diagonal seat belt.
- Removable foam pads and rolls to allow extra support where required.
- Simple clip between the chest pads to prevent the child from struggling out of the harness once strapped in
- Adjustable crotch strap and padded head support to cater for children of different sizes
- Accessories such as crotch pommel, spare foam pads and rolls, spare cover and replacement head supports.

A specialist version of the seat was developed for multiple uses in buses and coaches operated by Local Authorities, by schools and by voluntary associations. The cover is easily washable grey vinyl, heavily padded side and seat panels, adjustable head support pads, and shaped crotch pad to maximise protection and comfort. The seat is attached to the bus/coach seat using two seat belt straps with the buckles sited beneath the seat to make them tamperproof. This information comes from a Britax product catalogue for 2004.

11.3 Transport in Ireland

In 2004 the National Disability Authority published 'Towards best practice in the provision of transport services for people with disabilities in Ireland'[99] http://www.nda.ie/cntmgmtnew.nsf/0/05F69E6DCA8CBFE580256E6300311E57?OpenDocument. This report contributes to strategic aims by providing baseline evidence on the level and range of service provision in Ireland for people with disabilities and a review of international practice in the field, against which to measure Ireland's strengths and weaknesses in the sector. This led onto guidelines being produced to help public transport operators provide readily usable service to people with disabilities[100] http://www.nda.ie/cntmgmtnew.nsf/0/C0DBA1BA241FB9398025710F004D8EAA?OpenDocument.

There is an ongoing commitment to provide "Transport for all" in current policy. The National Development Plan contains a number of commitments regarding investment in transport infrastructure and facilities. Specifically all new and upgraded rail and bus stations, all light rail vehicles and suburban railcars and all buses financed under the NDP must be accessible to people with mobility and sensory impairments. The guidelines are very comprehensive but do not make any specific mention of children or disabled children.

11.4 Transport in Greece

Regarding public transport access, contact with the Athens University of Economics and Business – Library, European Documentation Centre, reported that Greek legislation opposes different standards for the different types of vehicles used by disabled people, while there is no obligation for taxis to follow these standards.

According to the Hellenic Ministry of Transport and Communications, http://www.yme.gr, public transport has been enhanced to make it accessible to people with disabilities.

11.4.1 Greek railways (OSE)

Infrastructure
Major interventions have been made in order to improve accessibility and service for people with disabilities in OSE train stations, which include for example the following:

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[99] National Disability Authority (2004) Towards best practice in the provision of transport services for people with disabilities in Ireland, National Disability Authority, 25 Clyde Road, Dublin 4, Ireland
http://www.nda.ie/cntmgmtnew.nsf/0/05F69E6DCA8CBFE580256E6300311E57?OpenDocument.
[100] National Disability Authority (2005a) Transport Guidelines Document, National Disability Authority, 25 Clyde Road, Dublin 4, Ireland.
http://www.nda.ie/cntmgmtnew.nsf/0/C0DBA1BA241FB9398025710F004D8EAA?OpenDocument.

Athens Train Station (Larisis)
- Service desk for disabled people.
- Two clearly marked parking spaces have been reserved in front of the station.
- An access ramp to the pavement has been built.
- An access ramp has been built between the pavement and the station's entrance and main platform.
- Sliding doors that open automatically with a photocell have been installed.
- Visual (special electronic boards) and vocal announcements of train departures and arrivals.
- Special lifts have been installed in the underpass to allow access for wheelchair users to the station's second platform.
- The station has two lifting devices.
- Special WC for disabled people is available.

Thessaloniki Train Station
- Two parking spaces are available for disabled persons.
- Access from the outside area to the station is on the same level.
- Sliding doors that open automatically with a photocell have been installed.
- At one ticket counter a special platform with access ramp has been built for wheelchair users.
- A special lift has been installed for disabled persons, which connects the ticket counters and waiting room area with platform 1.
- Special WC for disabled people is available.
- Visual (special electronic boards) and vocal announcements of train departures and arrivals.
- Appropriate interventions have been made with special services available at the Athens Peloponnisou Station and the stations of Lianokladi, Paleofarsala, Sofades, Karditsa, Trikala, Kalabaka, Volos, Rapsani, Evangelismos, Litohori, Eginio, Patras, etc.

Rolling stock
Thirty lifting devices have been built for the boarding and disembarking of wheelchair users or people with motor problems. Two of these are available at the Athens Larisis Station. The others are expected to be immediately available at the remaining stations.

12 Health and welfare

12.1 Services and support

A brief review was made of health and welfare services and support for children with disabilities. Many references are available in this area which describe the current situation. For example, there are several papers concerned with access to health and welfare services for children with disabilities[101] [102] [103], but mainly within the USA. More could be researched in this area, but it is felt that it is not within the current remit.

In the UK, the Children's National Service Framework (NSF), published on 15 September 2004, sets standards for children's health and social services, and the interface of those services with education. Standard 8 of the NSF concentrates on the needs of disabled children and those with complex health needs http://www.dh.gov.uk/PolicyAndGuidance/HealthAndSocialCareTopics/ChildrenServices/ChildrenServicesInformation/fs/en

The NSF is intended to lead to a cultural shift, resulting in services being designed and delivered around the needs of children and families. The Children's NSF is aimed at everyone who comes into contact with, or delivers services to children, young people or pregnant women. To support services in implementing the NSF, a database of examples of emerging practice has been developed. These examples have been gathered from the External Working Groups, local government, health bodies and the voluntary and community sector, and are consistent with the principal themes in the NSF.

Children with a disability are automatically defined as children in need under the Children Act 1989. Local councils are required to maintain a register of disabled children in its area and to provide services to minimise the effects of their disabilities and to promote opportunities for social inclusion. The Carers and Disabled Children Act 2000 requires councils to assess carers' needs on request and allows for direct payment to disabled young people and to parents of disabled children.

The National Disability Authority (NDA) in Ireland aims to secure and promote the rights of people with disabilities in Irish Society. They sought to asses reported problems of access to appropriate mental health services by people with intellectual disabilities who may have psychiatric conditions or exhibit challenging behaviours. The study covered children, adults and elderly persons. One of the case studies in the report is of a 12 year old girl with challenging behaviour. The study illustrated the problems faced in obtaining appropriate service, in this case a specialist centre that was able to meet her needs. The report made several recommendations to allow people with intellectual impairments to gain better access to medical diagnosis,

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[101] Newacheck, P.W., Inkelas, M., Kim, S.E. (2004) Health services use and health care expenditures for children with disabilities, Pediactrics, Vol. 114, Issue 1, pp 79-85.
[102] Heaton, J., Noyes, J., Sloper, P., and Shah, R. (2005) Families' experiences of caring for technology-dependent children: a temporal perspective, Health & Social Care in the Community. Blackwell Publishing, Oxford. Vol. 13, Issue 5, pp 441-450. http://www.planningportal.gov.uk/england/professionals/en/400000000988.html
[103] Warfield, M. E. and Gulley, S. (2006) Unmet need and problems accessing specialty medical and related services among children with special health care needs. Maternal And Child Health Journal, 10, 2, 201-216, Springer/plenum Publishers New York.

treatment and care, and support particularly during acute psychiatric episodes. The findings are likely to be applicable in many European countries[104].

12.2 Hospital design

A specialist standalone hospital with 140 beds for children at St Thomas' Hospital on London's South Bank was opened in October 2006. The architects Hopkins won a RIBA (Royal Institute of British Architects) award for the design of the Evelina Children's Hospital for developing an innovative workspace design. This had broken with the traditional layout of long corridors and bland wards, by planning a simple section of two long blocks flanking a central concourse, which rises to the full height of the building. This provides a flexible workplace to meet the need for both efficient operations and social interaction. The interior also has a cheerful and colourful ambience, creating the positive environment for the treatment of children. http://www.fxmagazine.co.uk/story.asp?storycode=961

Figure 13 : Three images from the Evelina hospital including a child sized MRI scanner, the Starslide helter skelter, and the Beach Atrium, a large open space, several stories high, with a glazed roof

The purpose-built seven-storey, glass-fronted building enjoys dramatic views across London and of local landmarks such as Lambeth Palace and the Houses of Parliament. There are pull-down beds for parents staying overnight and a four-storey glass conservatory which can host musical and other performances to help promote a healing environment. The building is naturally lit and ventilated to create a sense of being in the fresh air. There is also a café and school. The new Evelina has 140 inpatient beds including 20 intensive care beds for the most seriously ill children; three operating theatres; a kidney dialysis unit; a full imaging service with MRI scanner, general x-ray and ultrasound; a medical day care unit and outpatients department. The aim has been to create a hospital that does not feel like a hospital. http://www.gsttcharity.org.uk/projects/evelina.html.

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[104] National Disability Authority (2003) Review of access to mental health services for people with intellectual disabilities, 25 Clyde Road, Dublin 4, Ireland.

13 Accidents and safety

Regarding *children and accidents* there is much literature covering different environments such as accidents in the home[105], accidents involving carrycots and transporters[106] as well as in depth studies[107]. Practical guidelines have been produced by Page[108]. A paper by Smith-Jackson[109] presents an overview of the important factors researchers should consider when conducting safety-related research that involves children.

13.1 General guidelines relating to accidents and safety for children

Kroemer[110] (p58) describes five approaches to attain safety through ergonomic design as described below with modified examples. It can be seen that these could form the basis for designing for children with disabilities provided the relevant ergonomic data are available.

1. Achieve fit by proper sizing to ensure a good match between the object and its user e.g. child restraint in a car, children's toilet.
2. Ensure reach so that the human can access, use and operate devices properly and effectively e.g. door handles and hand rails (considering the smallest and weakest users).
3. Provide safe clearance so that objects cannot hurt users or are not in the way e.g. legroom at a computer workstation, escape passages.
4. Avoid entrapment of the body, e.g. railing on a child's bed or an exhibit in an interactive display in a museum.
5. Provide exclusion, for instance by barriers and guards, so that dangerous spaces cannot be routinely or inadvertently accessed and dangerous actions cannot be committed. For example, avoiding easy reach to window ledges in a child's room, provide medicines and cleaning materials out of reach from children.

Important considerations derived from developmental psychology are discussed in terms of their application to efforts to elicit the needs, preferences, attitudes, and perceptions of children. Few papers seem to relate specifically to disabled children although articles such as Bijur et al[111] from the American Journal of Disabled Children are likely to be a fruitful source. The authors report that accidental injuries are the leading cause of death in the United States and other developed countries. From the analysis of their study of 11,966 pre-school children, they found an

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[105] Cliff K and Li H. (1983) Children in danger: accidents in the home. Nursing Mirror, 1-8.

[106] Whittington, C. (1984) Accidents involving carrycots and transporters. Consumer Safety Unit.

[107] Parkin, D. (1981) Taking a closer look at child accidents. Care in the Home, 17, 9.

[108] Page M. (1986) Child safety and housing: practical design guidelines for commissioning agencies, architects, designers and builders / compiled for the Child Accident Prevention. London: Bedford Square Press for the Trust.

[109] Smith-Jackson, Tonya L. (2002) Child-Centered Safety Research Issues, The Proceeding of the XVI Annual International Occupational Ergonomics and Safety Conference, (ISOES), Toronto, Canada, June 9-12, 2002. http://education.umn.edu/kls/ecee/pdfs/ChildCenteredSafetyResearchIssues_SmithJackson.pdf

[110] Kroemer, K. H. E. (2006) Designing for "extra-ordinary people": Disabled and elderly, expectant mothers and children, Taylor and Francis and HFES, ISBN: 0-8493-3668-6.

[111] Bijur, P. E., Stewart-Brown, S. and Butler, N. (1986) Child behaviour and accidental injury in 11,966 preschool children. American Journal of Disabled Children 1986; 140, 5, 487-92.

association between aggressive behaviour and accidental injuries and between over-activity and injuries not resulting in hospitalisation. This association was independent of other factors including social class, crowding, mother's psychological state, age, marital status and gender of the child. Although Bijur et al do not discuss children with disabilities as a specific group, they conclude that the identification of high risk groups can be used to direct education and to provide a safer physical environment to families in which there are children with high risk behaviours.

In terms of standards, ISO/IEC Guide 50[112] addresses physical hazards to children, but specifically excludes the needs of people with disabilities, although it suggests that additional requirements may be appropriate for children with special needs. The Guide covers

1. Poisoning (toxicity)
2. Injuries from fire and flammability
3. Burns from contact with heated surfaces.
4. Scalds
5. Ingestion and inhalation of foreign bodies
6. Falls
7. Mechanical hazards and construction features
8. Electric shock
9. Injuries from aquatic hazards (drowning).

The Guide stresses the need for standards to consider child behaviour, response patterns, levels of cognitive behaviour and conceptual abilities at different ages. It should also consider the anthropometric data relating to those children for whom the product is mainly designed. Standards should also specify appropriate ages and any limitations in use. These points have particular relevance when considering children with disabilities.

13.2 Accidents and safety in UK homes

Within the home, child safety is a key area and guidelines have been established for children in general. The report by Page[113] on behalf of the Child Accident Prevention trust is a good example. This report gives the statistic that each year, 250,000 children in the UK go to hospital following an accident involving architectural features in the home. Children will always have accidents, since the very nature of being a child involves taking risks. Being shorter, children have a different viewpoint so may not see a hazard and an adult may not see them. Their perception and understanding of the world is less well developed and while their eyesight may be acute, their ability to comprehend and cope with what they see is not developed. It is the responsibility of adults therefore to remove from the child's immediate home environment features that are inherently hazardous to him or her.

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[112] International Organization for Standardization (2002) ISO/IEC 50:2002, Safety aspects - Guidelines for child safety, International Organization for Standardization (ISO), 1, rue de Varembé, Case postale 56, CH-1211 Geneva 20, Switzerland.
[113] Page M. (1986) Child safety and housing: practical design guidelines for commissioning agencies, architects, designers and builders. Compiled for the Child Accident Prevention Trust, Bedford Square, London 1986. ISBN: 0-7-199 11613.

The guidelines developed by Page cover:
- The layout of circulation spaces (entrance hall, stairs and landings). Guidelines for example include designing U or L shaped stair flights, providing a lower handrail (diameter 38mm and 610mm high), providing good lighting and fixing position for stair gates at top and bottom of stairs.
- Kitchens: proving routes through that don't impinge on the sink/fridge/cooker work triangle, position kettle and toaster point away from the sink and cooker, provide a lockable cupboard or high level cupboard for storing cleaning products.
- Bathroom: avoid positioning wash basin so it overhangs bath, specify baths with safety grab handles, fit showers with thermostatically controlled mixer valves, and towel rails with thermostatic controls to reduce the chances or burns, ensure floors are slip resistant.
- Rooms generally: In the room avoid using split level floors without clearly marking change of level, install circuit breakers to protect power circuits of the home, provide storage so that children's articles are within reach or children and adult articles are out of reach.
- Outdoors: Ensure fences and gates are designed so that small children find them difficult to climb or open, avoid positioning doors that open into driveways, car ports and garages, avoid steps in paths and minimise consequence of falling up or down door step, ensure paved areas and external steps slip resistant.
- Windows and glass: avoid making windows in rooms designed for children easy to open; avoid window sills in children's rooms above ground level that are easily climbable on or ledge for sitting on; avoid using glass where it can easily be broken; and avoid using glazing in a door at the foot of the stairs.
- Doors: provide all swing doors with safety glass; avoiding hanging a door so when opened it can encroach into space where a child may be playing; avoid using door closures or pivoting doors unless explicitly required so that children's fingers are not trapped.
- Heating equipment: avoid positioning radiators at the bottom of flight of stairs as they can cause injury when hit by a child falling down; all fitted gas and electric fires should have fireguards that conform to British Standard BS 1945:1971 (British Standards Institution, 1971); avoid placing flame burning heating appliance near to draughts or windows.

It should also of course be emphasised that many of these safety and design recommendations are good design for everyone.

With regard to children with cognitive disabilities it may be argued that they may be less able to foresee a risk and slower to react if faced with an impending hazard. This will certainly be true of children with a visual impairment who have not learned to move around safely within their home environment. Similarly for children with physical disabilities, they will perhaps have a certain level of uncoordination that means they will be more prone to accidents. It may be hypothesised then that such children will be at a greater level of risk. This view was supported by a representative of the Royal Institute of British Architects (RIBA) and Aedas who was interviewed.

13.3 Pedestrian safety in Sweden

A paper was presented at the ICTCT conference on traffic safety about initiatives in Sweden to reduce traffic accidents including those involving pedestrians[114]. Some general guidelines were included relating to disabled people and to children. These include the following examples:

- Public places in a town have a great inherent potential for both planned and unplanned encounters, which should be made possible, and even facilitated, by the design of the streets in a city. These places should be accessible to everyone, including children, elderly and disabled people.

- A Street must have a clearly distinctive design. One of the most important aims in connection with street design is to give people using the street the ability to understand, preferable intuitively:
    - what kind of street they are on,
    - what (traffic) behaviour is expected from them,
    - what (traffic) behaviour they can expect from others.
  For that reason the different types of streets must have their own clearly distinctive design. It must be obvious from this design what has been prioritised; e.g., vehicle accessibility onto traffic routes or 70 km/h roads, and consideration given to children, elderly and disabled people on woonerfs. (A 'woonerf' in the Netherlands, Flanders and Sweden is a street or group of streets in a town or city where pedestrians and cyclists have legal priority over motorists.)

- Street Design: Carriageways normally only have two lanes for ordinary car traffic. A 50/30 km/h street also has wide bicycle paths and wide pedestrian pavements, affording cyclists and pedestrians good accessibility, safety and security. Furthermore, these wide walkways and paths provide the potential for creating an attractive, pleasant street space that is also environmentally suitable for children, elderly and disabled people.

- Walking Speed Street (woonerf or pedestrian street): A 'walking speed street' is a communal outdoor space shared by everyone living by the street. It is a street especially for children, elderly and disabled people. A walking speed street is an attractive, pleasant street space for meetings, play and recreation. It is used by cars and by bicycles only when they come from a destination or go to a destination along it or a street nearby.

- The car-free area in a town has a great potential for both planned and unplanned encounters, which should be made possible and even facilitated, by the urban street design. In this type of area it is possible for pedestrians, bicyclists, children, elderly and disabled people to move around safely and securely in built-up areas. Cyclists must be able to move at speeds up to 30 km/h on bicycle tracks and on certain greenways; however, in other places such as woonerfs, cyclists are required to ride at walking speed.

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[114] Wramborg, P. (1998) A new approach to traffic planning and street design in Sweden, International Co-operation on Theories and Concepts in Traffic Safety (ICTCT) conference, Budapest. http://www.ictct.org/workshops/98-Budapest/1.pdf

It can be seen that a traffic planning scheme of this kind would benefit children with disabilities. The paper includes a case study for Jönköping street network, traffic system designed more or less according to the philosophy presented in the paper. Elevations of the carriageway at street intersections to walkway level, in combination with lower traffic speeds, can substantially ease access for children, elderly and physically disabled people. The measures can also create a more aesthetically pleasing traffic environment in our cities. Some researchers also maintain that such measures also lead to positive effects within many different areas of society.

13.4 Accidents and safety research related to disabled children
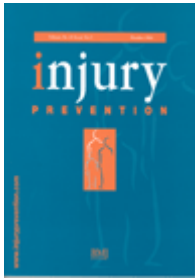
Figure 14: Cover page of the journal Injury Prevention

A number of studies on accidents and safety have been identified related to children with disabilities within the journal, Injury Prevention (http://ip.bmj.com/).

Petridou et al (2003)[115] compared the effect of different socio-demographic and situational factors on the risk of injury among disabled and non-disabled children. During the period 1996–2000, 110,066 children were studied in two teaching hospitals in Athens and two district hospitals. Within this sample, 251 of the children were identified as having a motor/psychomotor or sensory disability before the injury event.

The authors found that falls and brain concussion were proportionally more common among disabled children, whereas upper limb and overexertion injuries were less common among them. Urban environment, migrant status, and cold months were also associated with increased odds for injuries to occur among disabled rather than non-disabled children. The likelihood of the occurrence of an injury among disabled children seemed to increase with age. The authors concluded that these results provide the information for setting up trials which could lead to preventive measures for disabled children at increased risk of severe injuries.

Roberts and Norton (1995)[116] examined the association between sensory deficit and the risk of child pedestrian-motor vehicle collisions in Auckland, New Zealand. A community based case-control study was conducted of 190 children under 15 who were killed or hospitalised as a result of a pedestrian injury occurring on a public road. They found that
- the risk of pedestrian injury for children whose parents reported abnormal vision was over four times that of children with reported normal vision
- the risk of injury for children whose parents reported abnormal hearing was close to twice that of children with reported normal hearing

The authors concluded that children with sensory deficits constitute a high risk group for pedestrian injuries and so paediatricians caring for children with sensory impairments should be aware of this increased risk.

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[115] Petridou, E., Kedikoglou, S., Andrie, E., Farmakakis, T., Tsiga, A., Angelopoulos, M., Dessypris, N. and Trichopoulos, D. (2003) Injuries among disabled children: a study from Greece. Injury Prevention, BMJ Publishing Group, 9, 226-230.
http://ip.bmj.com/cgi/content/full/9/3/226
[116] Roberts and Norton (1995) Sensory deficit and the risk of pedestrian injury, Injury Prevention, 1995:1, 1, 12-14, BMJ Publishing.
http://ip.bmj.com/cgi/content/abstract/1/1/12?maxtoshow=&HITS=10&hits=10&RESULTFORMAT=&searchid=1&FIRSTINDEX=20&minscore=5000&resourcetype=HWCIT&eaf

Sherrard et al (2001)[117] studied carer reports of medically attended injuries to 257 young people, aged 5–29 years in 1996. This study formed part of the Australian Child and Adolescent Development (ACAD) programme examining emotional and behavioural problems in a cohort of young people with intellectual disability (IQ<70). They found that the rate for injury hospitalisations was twice that of the general population. Falls were more common and transport injury and intentional injury less common causes of injury morbidity compared with general population. They also found that patterns of cause, circumstances, and severity of injury in young people with intellectual disability have more similarities with younger children than with their same age group in the general population. The authors urged that injury prevention programmes be implemented and evaluated for their effectiveness in reducing the substantial additional burden of suffering, care and cost resulting from injury to young people with intellectual disability.

A paper by Ramirez et al (2004)[118] describes the epidemiology of school related injury among children enrolled in 17 special education schools in one large, urban school district in Los Angeles. The authors report that approximately six million children with disabilities attend school in the United States. Cognitive and physical limitations may compromise their ability to handle environmental hazards and hence increase their risk for injury. Altogether 6769 schoolchildren with disabilities were studied from which a total of 697 injuries were reported.

The results showed that children with multiple disabilities had a 70% increased odds of injury compared with children with developmental disabilities. Physically disabled children had a modest increased chance of injury. Cuts, bruises, and abrasions composed almost three quarters of all injuries; almost half of these injuries were to the face. Falls and insults by other students were the most common external causes. More than a quarter of injuries were sports related. Injury patterns differed across disability groups. While the study is limited to one school district, potentially high risk groups were identified and circumstances of injury described. As for the other studies, they feel that this information is imperative for developing and improving school based injury prevention measures.

In the project proposal a number of issues were raised about children with disabilities. Some feedback on these questions was obtained from one person, a representative of RIBA and Aedas, who was interviewed on the 1st December 2006.

Are children with disabilities at greater risk of accidents than non-disabled ones?
The person's view was that children with disabilities are not especially at greater risk, other than the inherent risk associated with particular disabilities, such as dyspraxia which affects coordination or those children who have a reduced concept of risk. This view, however, appears to contradict findings reported in the literature above. Further study may therefore be required to answer this question (and those below) more precisely.

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[117] Sherrard, J., Tonge, B. J. and Ozanne-Smith, J. (2001) Injury in young people with intellectual disability: descriptive epidemiology. Injury Prevention 2001;7:56-61, BMJ Publishing.
http://ip.bmj.com/cgi/content/abstract/7/1/56?maxtoshow=&HITS=10&hits=10&RESULTFOR MAT=&searchid=1&FIRSTINDEX=10&minscore=5000&resourcetype=HWCIT&eaf
[118] Ramirez, M., Peek-Asa, C. and Kraus, J. F. (2004) Disability and risk of school related injury, Injury Prevention 2004;10:21-26, BMJ Publishing.
http://ip.bmj.com/cgi/content/abstract/10/1/21?maxtoshow=&HITS=10&hits=10&RESULTFOR MAT=&searchid=1&FIRSTINDEX=0&minscore=5000&resourcetype=HWCIT&eaf

Are there any differences in level of risk regarding children with different disabilities?
It was felt by the interviewee that there were differences in level of risk but this will be dependent upon the circumstances and the type of disability, i.e., visually impaired children will be at greater risk in certain locations undertaking certain activities. It is not automatic that all disabled children are more at risk as often management can alleviate that risk. Risk assessments should be completed in relation to the above.

To what extent can we design generic, inclusive facilities to meet the needs of a wide range of disability conditions?
To a large extent this can be achieved. However, although we have guidance to meet a wide range of adults' needs there is little in relation to children's needs or those whose disability falls into the sensory and cognitive areas.

To what extent must we design specialist versions to meet the needs posed by different disabilities?
There is of course the need to ensure that designs meet all needs. Correctly done they do not have to be specialist; it is just another factor in the design process. Designers need to understand the anthropometrics and the limiting factors which disability can cause and design accordingly.

14 Guidance for standards developers

14.1 Older persons and persons with disabilities

ISO Guide 71[119] has been designed to address the needs of older persons and those with disabilities. Its European equivalent is CEN/CENELEC Guide 6[120] http://www.cenorm.be/BOSS/supporting/reference+documents/cclcgd006.pdf. These Guides provides advice for standards developers. However, children are not the focus of attention of them. They describe a process by which the needs of persons with disabilities may be considered in the development of standards. They include a table to enable standards developers to relate the relevant clauses of a standard to the factors which should be considered to ensure that all abilities are addressed. They also offer descriptions of body functions or human abilities and the practical implications of impairment.

While it is recognized that accessibility and usability are important for both products and services, international work on services standards is at the preliminary stage. At present, this Guide contains considerably more guidance on products than on services. Nevertheless Guide 6 will be a very useful resource for developers of standards for children with disabilities.

14.2 Children

Equally important is CEN Guide 12, Child Safety, Guidance for its Inclusion in Standards[121]. Guide 12 is intended to assist standards' writers to take children's safety into account when drafting new or revising existing standards.

As previously described, ISO/IEC Guide 50[122] also addresses physical hazards to children. It specifically excludes the needs of people with disabilities, but suggests that additional requirements may be appropriate for children with special needs.

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[119] International Organization for Standardization (2001) ISO/IEC Guide 71, Guidelines for standards developers to address the needs of older persons and persons with disabilities, International Organization for Standardization (ISO), 1, rue de Varembé, Case postale 56, CH-1211 Geneva 20, Switzerland.

[120] CEN/CENELEC Guide 6: 2002. Guidelines for standards developers to address the needs of older persons and persons with disabilities, European Committee for Standardizardization and European Committee for Standardizardization, Rue de Stassartstraat, 35-36, B - 1050 Brussels. http://www.cenorm.be/BOSS/supporting/reference+documents/cclcgd006.pdf

[121] CEN Guide 12: 2006. Child Safety, Guidance for its Inclusion in Standards. European Committee for Standardizardization, Rue de Stassartstraat, 36, B - 1050 Brussels. http://www.cenorm.be/BOSS/supporting/reference+documents/cenguide120606.pdf

[122] International Organization for Standardization (2002) ISO/IEC 50:2002, Safety aspects - Guidelines for child safety, International Organization for Standardization (ISO), 1, rue de Varembé, Case postale 56, CH-1211 Geneva 20, Switzerland.

15 Summary of key documents by context or sector

The following table lists key documents, resources and organisations underlying the report. It shows the extent to which different contexts or sectors are covered by legislation, standards, guidelines or research. See reference list (Appendix 1), list of standards (Appendix 2) and lists of organisations (Appendix 3) for details.

Table 1: Coverage of different contexts by key documents relating to (1) people with disabilities, (2) able-bodied children and (3) children with disabilities (emboldened)

Context/Sector	Research and Resources	Guidelines	Standards	Legislation & Directives
Policy	• **Save the Children (2001) Disabled children's rights** • EC (2003) European Action Plan • EC (2003) Disabled people in enlarged Europe • Disability Rights Commission www.drc-gb.org • National Disability Authority www.nda.ie • Swedish Agency for Disability Policy Coordination www.handisam.se		• ISO/IEC Guide 71 (2001) • BS7000-6 (2005) • CEN/CENELEC Guide 6 (2002)	• UNICEF Convention on the Rights of the Child (1990). • Child Care Act (Ireland) (1991) • Support and Service for Persons with certain Functional Impairments (Sweden) (1993) • Disability Discrimination Act (UK) (1995. 2005) • Prohibition of Disability Act (Sweden) (2003)
Public buildings		• **Bails and Seger (1998)** • **Swedish Handicap Institute (1990)**	• AS1428 (1992-01) • **AS1428-3 (1992)** • BS 8300 (2001) • ISO/TC 59/SC 16/WG1 21542 (2006)	• UK Building regulations Document M (2004) • Rogerson et. al. (Ireland) (2005)
Homes (dwellings)	• Allen et al (2002) • Bevan (2002) • Berresford and Oldamn (2002) • **Whitehurst (2006)**	• Samová et al (1999) • Samová and Puškár (1997) • NDA (2002) Buildings for everyone	• BS5810-3 (1979) • BS 8300 (2001) • ISO/TC 59/SC 16/WG1 21542 (2006)	• UK Building regulations Document M (2004)
Sanitation facilities	• de Bruin and Molenbroek (2003) • Bichard et al (2006)		• BS5619 (1978) • BS6465-1 (2006) • BS6465-2 (1999) • BS6465-3 (2006)	
Car parking			• BS 8300 (2001)	• UK Building regulations Document M (2004)
Schools (buildings and teaching services)	• **Gillinson and Green (2006)** • **Huwiler (2006)** • **McConachie (2006)** • **Maguire et al (2006)**	• **DfES (2002) Accessible Schools** • **Building Bulletins** **- 77 (2005)** **- 91 (1999)** **- 93 (2003)** **- 94 (2001) (UK)**		• **SENDA (2001)** • **SEN Strategy (2004)**

Playgrounds and play areas		**• OPDM (2003)** **• John and Wheway (2004) for the National Playing Fields Association**	**• CEN/TC 136 SC1 (2005)**	
Public Transport		• Dept. for Transport (2005) Inclusive mobility • DPTAC (2006) Meeting needs of disabled travellers • DRC (2006) Code of practice: Provision and use of transport • Whitney (2006) • NDA (2006) Provision of transport		• Disability Discrimination Act (UK) (1995. 2005) • European Disability Forum (2005) • Dept. for Transport (2006) Statutory Instrument 2006, No. 1094
Health and Welfare	• NDA (2003) Review of access **• Newacheck et al (2004)** **• Heaton et al (2005)** **• Warfield and Gulley (2006)**			
Accidents and safety	• Parkin (1981) • Cliff and Li (1983) • Whittington (1984) • Roberts and Norton (1995) **• Sherrad et al (2001)** **• Petridou et al (2003)** • Ramirez et al (2004)	• Bijur et al (1986) • Page (1987) • Wramborg (1998) • Smith-Jackson (2002) • Kroemer (2006)	• ISO/IEC Guide 50 (2002) • CEN Guide 12 (2006)	

16 Conclusions

- There is little information available which is specifically targeted at the safety, access and usability needs of children with disabilities. Contacts with potentially relevant associations and experts resulted in many "dead ends". However, what did clearly come across is an appreciation of the need for further research and/or standards.

- In terms of building regulations many countries follow the UK building regulations either Document M or the BS8300 standard, while the ISO equivalent is being developed. These standards tend to have limited references to children with disabilities. Bodies across Europe (e.g. charities) provide general advice and support but little specific information for designers and architects.

- The most developed sector for children with disabilities seems to be education. This may be simply with regard to Individual Education Plans (IEPs) or with regard to specific legislation such as SENDA (UK Special Educational Needs and Disabilities Act).

- Standards for disabled people are expected to be inclusive of both adults and children but it is important that they are inclusive in reality. For example recommendations for wheelchair spaces and handrails should support both groups.

- Experts tend to recommend that such provision be made more explicit to clearly demonstrate that the standard is covering children and children with disabilities. An example might be the Australian standard (AS1428.3, 1992) Design for Access and Mobility – part 3: Requirements for children and adolescents with physical disabilities. However, this is not only quite an old standard, but is also based on research that is nearly 20 years old.

- Research and further evidence is needed if standards are going to be changed or enhanced to meet the needs of children with disabilities. This should include further study as to whether disabled children are more prone than able-bodied children to injury or accident.

17 Recommendations

- Since some experts tend to feel that legislation and standards providing for people with disabilities also already cover children, further investigation is needed to ascertain whether or not this presumption is correct. If so, the inclusion of children should be made more explicit. This data should be evidence based, rather than just based on the opinions of experts.

- Specific areas need to be identified where the functional needs of disabled children may differ from the needs of other children or adults with disabilities. This may lead to decisions where an existing standard should already cover children with disabilities, or where the existing standard needs modification or further provisions.

- In order to modify existing standards or specify further provisions, it is necessary to produce new ergonomic data relating to children with disabilities. This data should be functional rather than medical in order to span the range of disabilities, and should follow the principles of social participation as laid down in the ICF. Although a pilot survey of anthropometric and capability data of older and disabled people is being planned as part of the UK's EPSRC i~design3 project (of which ESRI is a part), children with disabilities are not specifically being included in that research.

The figure below represents these first three recommendations diagrammatically. The first three overlapping circles represent the extent to which the needs of children with disabilities are covered by existing guidelines, standards, etc., for adults with disabilities and for children in general. As shown by the lower three circles, although these guidelines and standards should be enhanced to better cover the needs of children with disabilities (either explicitly or implicitly), it is unlikely that they can be fully covered especially as children's needs in relation to particular conditions, e.g. cognitive and communication impairments, need to be better understood. Thus guidelines independent of, or adaptable to, context may be needed to address this gap (possibly in the form of a CEN ISO 'Guide').
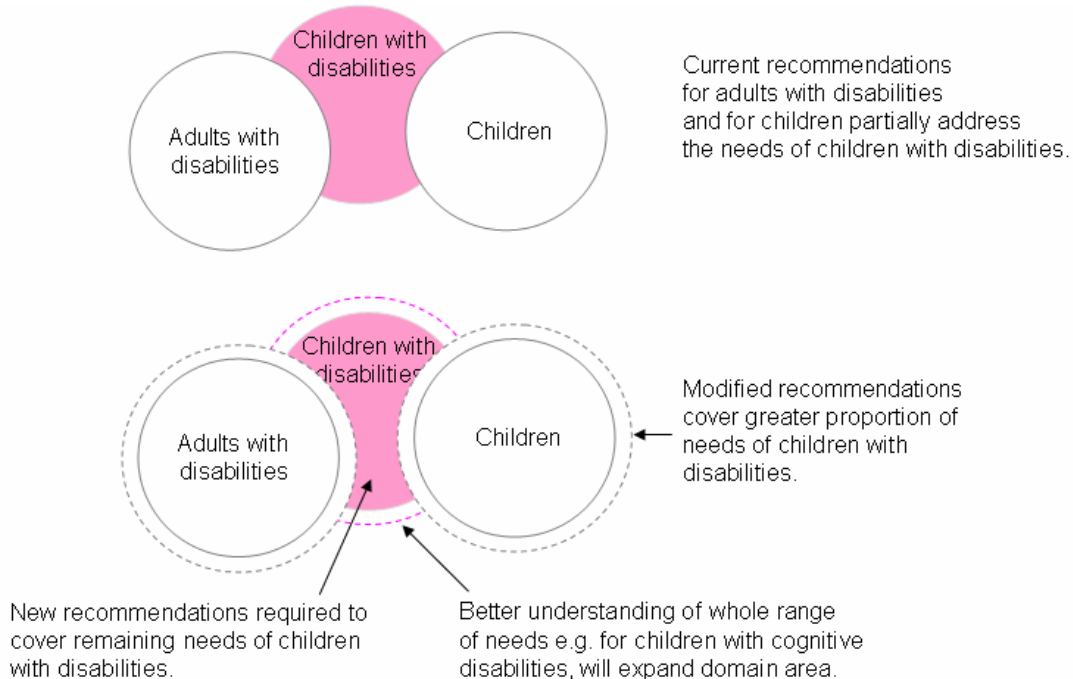
Figure 15: Venn diagrams showing the coverage of the needs of disabled children (represented by a circle) by knowledge and guidelines for (1) adults with disabilities and (2) children in general (two other circles partially overlapping it). The upper diagram shows how the needs of children with disabilities are only partially covered. The lower diagram (future knowledge and guidelines) shows the two circles increased in size to represent an increased coverage of the needs of children with disabilities. However a better understanding of the needs of different types of disability that children have means that there is also a greater area of need to be covered.

- Consider and investigate whether it is possible to use standard dimensions for children with disabilities e.g. reach, height and levels of strength, *for the whole of Europe*, as a basis for developing standards and guidelines.

- Since legislation and standards mainly address mobility impairments, people with visual, hearing and cognitive impairments, including those of children, need to be explicitly considered. Factors in CEN/CENELEC Guide 6 and CEN Guide 12 should be drawn out to ensure full coverage of relevant issues.

- The proposed research described above supports the need for the suggested revisions to ISO 21542 Building construction – Accessibility and usability of the built environment.

- Assuming that the recommendations above lead to evidence that change is needed to accommodate children with disabilities, we would recommend a multi-faceted approach. New or enhanced standards must be accompanied by case studies, advice and support in the principles and practices of inclusive design. This will help to ensure that developers do not merely reach the minimum standards, but strive to achieve and establish good practice and the highest quality of experience for all users.

18 Acknowledgements

The authors, Martin Maguire and Colette Nicolle, would like to thank the following people and organisations who contributed information for this report:

19 Appendix 1: References and bibliography

This Appendix contains a full list of references from the text plus other useful sources providing guidelines, standards or research results.

The following table lists the most relevant documents drawn from the Appendix relating to (1) children and (2) to people with disabilities and (3) children with disabilities. These are grouped by sector or activity i.e. policy, public buildings, home (dwellings) etc. The number of items in each cell gives a rough indication of where there is much or little information available.

Table 2: Coverage and key documents relating to children, people with disabilities and children with disabilities

CONTEXT/ SECTOR	CHILDREN AND YOUNG PEOPLE	PEOPLE WITH DISABILITIES	CHILDREN WITH DISABILITIES OR SPECIAL NEEDS
Policy and rights	• Equal Treatment of Students at Universities Act (2001) • United Nations Children's Fund, UNICEF (1990) • United Nations Children's Fund (1996)	• UK Disability Discrimination Act (1995, 2005) • European Commission (1996) Equality of opportunity • European Commission (2005) Disabled people in the enlarged European Union • Long (2000) • National Disability Council. (1995) • Prohibition of Discrimination Act (2003) • Trtnik Herlec (2000)	• Repkova (2005) • Save the Children (2001) • Sustrova (2002) • SENDA (2001)
Public buildings		• BSI (1979) BS 5810 • BSI (2001) BS 8300 • Communities and Local Government: (2005) • Department of the Environment, Transport and the Regions (2006) Building Regulations Part M • ISO/TC 59/SC 16/WG CD 21542 (2006) • National Disability Authority (2002b) • Rahim (2005) • Rogerson et al (1995) • Samová and Puškár (1997) • Standards Australia (2001) • AS 1428, parts 1, 2 and 4 • Stationery Office, The (2000)	• Standards Australia (2001) AS 1428, part 3
Homes (dwellings)		• BSI (1971) BS 1945 (not related specifically to people disabilities) • BSI (1971) BS 5619 • Samová et al (1999)	• Allen et al (2002) • Beresford and Oldman (2002) • Bevan (2002) • Pelland and Mckinley (1997) • Swedish Handicap Institute (1990)

Schools (buildings and furniture)	• DfES (2002) Accessible Schools
	• DfES (2002) Consultation
	• Floyd and Ward (1969)
	• Gouvali and Boudolosa (2006)
	• Hänninen (2003)
	• Jeong and Park (1990)
	• Knight and Noyes (1999)
	• Linton (1994)
	• Morisette (2006)
	• Oxford (1969)
	• Weinstein (1985)
			• Building Bulletins
			  - 77 (2005)
			  - 91 (1999)
			  - 93 (2003)
			  - 94 (2001) (UK)
			• CEN/TC 207 prEN 1729 (2004)
			• Huwiler and Martens (2006)
			• Pain et al (1996)
			• Whitehurst (2006)

Education (teaching services, social aspects)		• Centre for Studies on Inclusive Education (2006)	• Ainscow and Haile-Giorgis (1998) • British Journal for Learning Support (2005) • DfES (2004) Removing barriers • DfES (2006a) Promoting Disability Equality • DfES (2006b) Implementing the DDA in schools • Department of Health (2002) Residential Special Schools • Gillinson and Green (2006) • Maguire et al (2006) • McConachie et al (2006) • National Disability Authority (2005) • Schenker et al (2006) • SENDA (2001)
Education and ICT or backpacks	• Anshel (2001) • Bennett (2001) • Bennett and Tien (2003) • Bradley (2001) • Casey and Dockrells (1996) • Harris (2000) • Jacobs (2002) • Katz (2001) • Oates et al (1999) • Zandvliet and Straker (2001)		
Playgrounds and play areas			• Besio (2004) • CEN/TC 136 SC1 (2005) • John and Wheway (2004) for the National Playing Fields Association • Joseph Rowntree Foundation (2006) • Office of the Deputy Prime Minister (2003)
Sanitation facilities		• Bichard (2006) • BSI (1996) BS 6465 • de Bruin. and Molenbroek (2003) • BS 6465-1-2006 • BS 6465-2-1996 • BS 6465-3-2006 (Standard relates to adults in general)	

Public Transport		• Department for Transport (2005) Inclusive mobility • Department for Transport (2006) Statutory Instrument • Disabled Persons Transport Advisory Committee (2006) • Disability Rights Commission (2006) Code of Practice • National Disability Authority (2004) • Nicolle (1997) • Nicolle and Burnett (2001) • Reneland (2005) • Whitney (2006) • Wramborg (1998)	
Health and welfare services and support groups	• Dinkevich et al (1996)	• National Health Service (2004)	• Department for Communities and Local Government (2005) • Heaton et al (2005) • National Disability Authority (2003) • Newacheck et al (2004) • Warfield and Gulley (2006)
Accidents and safety	• Berfenstam, R. and Soderquist (1992) • Bijur (1986) • CEN Guide 12 (2006) • Cliff and Li (1983) • COFACE (1991) • Culvenor (2002) • Harrell and Reid (1990) • Hunter et al (2005) • ISO/IEC Guide 50 (2002) • Li (2003) • Mayhorn et al (2006) • Norris and Wilson (1988) • Page (1986) • Parkin (1981) • Smith-Jackson (2002) • Tzoubadakes (1986) • Van Aken and Van • Weperen (1998) Guide 50 & Guide 51 • Whittington (1984)		• Petridou et al (2003) • Ramirez et al (2004) • Riczker et al (2005) • Roberts and Norton (1995) • Sherrard et al (2001)
Telecoms	• ETSI (2003a) • ETSI (2003a) • ETSI (2005a)	• ETSI (2005b)	
General literature (e.g. anthropometric data, usability design, managing accessible design)	• Childata (1995)	• BSI (1971) BS 7000-6 • CEN/CENELEC Guide 6 (2002) • Centre for Accessible Environments (2004, 2005) • ISO/IEC Guide 71 (2001) • National Disability Authority (2002a) • Nielsen (1994) • Dumas and Redish (1993) • Pheasant (1987) • Kroemer (2006) • Preiser and Ostroff (2001) • World Health Organisation, International Classification of Functioning, Disability and Health (2001)	• Bails and Seger (1988) • Mitchell & Sloper (2000) • Simpson (2006) • UNESCO (2006)

Ainscow, M. and Haile-Giorgis, M. (1998), The education of children with special needs: barriers and opportunities in Central and Eastern Europe. Innocenti Occasional Papers. Economic and Social Series, No. 67. Florence: UNICEF. International Child Development Centre. www.ied.edu.hk/csnsie/info/res2.pdf.

Allen, C. Milner, J. and Price, D. (2002) Home is where the start is: The housing and urban experiences of visually impaired children. Joseph Rowntree Foundation, www.jrf.org.uk. November 2002. ISSN: 1-86134-456-2. Available from Marston Books, Abingdon, Oxon, email: direct.orders@marston.co.uk.

Anshel, J.R. (2001) Kids and computers: eyes and visual systems. *This paper looks at the physical problems children may face with pro-longed computer use in schools. Adults used computers almost exclusively when they were first introduced. Today, millions of children are using computers every day, at school and at home, for education and recreation. Visual demands in school require the integration of a number of different vision skills: visual acuity (sharpness of vision); visual fixation (eye aiming); accommodation (focusing); binocular fusion (forming a single image); convergence (turning of the eyes); field of vision (side vision) and form perception (recognizing shapes). These systems can be stressed and overworked if not used efficiently. Computer viewing is complicating how children use their eyes in school because these visual skills are not yet fully developed in children. Children can experience many of the same symptoms related to computer use as adults. Extensive viewing of the computer screen can lead to eye discomfort, fatigue, blurred vision, and headaches. However, some unique aspects of how children use computers may make them more susceptible than adults to the development of these problems. The symptoms of physical problems that computer users are experiencing are increasing. Eye doctors have seen an increase in the number of patients who request eye examinations due to symptoms they experience at the computer. This has led to the American Optometric Association (AOA) designation of Computer Vision Syndrome.*

Bails, J. H. and Seger, B. R. (1988) Ergonomic design for physically disabled children. Adelaide, S. A. South Australian Department of Housing and Construction.

Bennett, C. and Tien, D. (2003) Ergonomics for Children and Educational Environments - around the world. *This paper briefly reviews activities and research related to children and educational environments. The increasing prevalence and role of information and communications technology in the lives of children as well as the incidence of back pain and heavy loads children carry in back packs are raising concerns around the world. Out of this concern an International Ergonomics Association Technical Committee has been formed. A survey was sent to Ergonomics for Children and Educational Environments membership and those who have communicated through the committee. The results are compiled to describe a cross-section of international efforts to address the health and the future of children.*

Bennett, C.L. (2001): Classrooms and Computers: An Elementary School Case Study. *Paper detailing the processes used to implement low cost ergonomic improvements and provide training for teachers, staff and students in an elementary school. Children now use computers throughout their education. As schools have focused on purchasing computers and providing internet access, there has been little consideration of ergonomics. Even if educators and school administrators acknowledge students would benefit from better ergonomics, they may assume it is too expensive or not know where to begin. This paper describes the processes used to implement low cost ergonomic improvements and provide training for teachers, staff and students in an elementary school. There is no mention of disabled children.*

Beresford, B. and Oldman, C. (2002) Housing matters: National evidence relating to disabled children and their housing. York: Joseph Rowntree Foundation, www.jrf.org.uk. November 2002. ISSN: 1-86134-483-X. Available from Marston Books, Abingdon, Oxon, email: direct.orders@marston.co.uk.

Berfenstam, R. and Soderquist, I. (1992) The rights of children to a safe environment, Swedish Laws and Regulations, National Board for Consumer Policies and National Child Environment Council. ISBN 91-87448-10-6. Gotab, Sweden, 1-47. *Covers small and older children at home, school, leisure centres, and with products. Describes efforts for a safer future for children.*

Besio, S. (2004) Using Assistive Technologies to Facilitate Play by Children with Motor Impairments: A Methodological Proposal, *Technology & Disability*, 16(3), 119-130.

Besio, S. (2003) They play and learn to play! First results of the Italian research project on play and children with motor impairment, in: G.M. Craddock et al. (Eds.). Assistive Technology. Shaping the Future. Atti del Congresso AAATE Dublin, 30 August– 3 September 2003.

Besio, S. (2002) An Italian research project to study the play of children with motor disabilities: the first year of activity, «Disability and Rehabilitation», 24, n. 1-3 January-February 2002 72-79.

Besio, S. (2001) Allowing children with motor impairment to play, learn, learn to play. A new Biennial Research Project of SIVA, Italy, in: Marin et al. (Eds.), 2001, Assistive Technology - Added Value to the Quality of Life, Amsterdam: IOS Press, Proceedings of AAATE 2001 Conference (Association for the Advancement of Assistive Technology in Europe), Ljubljana (Slovenia), 3-6 September 2001, 453-458.

Bevan, M. (2002) Housing and disabled children: the art of the possible, Joseph Rowntree Foundation, York: Joseph Rowntree Foundation www.jrf.org.uk. November 2002. ISSN: 0958-3084. Available from Marston Books, Abingdon, Oxon, email: direct.orders@marston.co.uk.

Bichard, J., Hanson, J. and Greed, C. (2006), Away from home (public) toilet design: identifying user wants, needs and aspirations, in designing accessible technology, J. Clarkson, P. Langdon and P. Robinson (eds), Proceedings of CWUAAT 2006. London: Springer-Verlag.

Bijur, P. E. (1986) Child behaviour and accidental injury in 11,966 preschool children. American Journal of Disabled Children 1986;140, 5, 487-492.

Bradley L. R. (2002) A healthy approach to classroom computers: preventing a generation of students from developing repetitive strain injuries. North Carolina Law Review, USA, 8 (1), p275-314, ISSN 0029-2524. *This paper explores potential ways to minimize children's risks for RSIs, both proactively and retroactively, and analyzes the best means of implementing a solution. This paper concludes that the preferred solution is a proactive one that incorporates federal guidance and funding but remains flexible enough to allow each state to tailor the solution to meet its unique needs.*

British Journal for Learning Support (2005) Special issue: Aspects of the role of special educational needs co-ordinator, Publisher: National Association for Special educational Needs, 20, 2, May 2005, ISSN 0268 2141.

British Standards Institution (1971) BS 1945: 1971, Specification for fireguards for heating appliances (gas, electric and oil-burning, *British Standards Institution*, 389 Chiswick High Road, London W4 4AL, United Kingdom.

British Standards Institution (1978) BS 5619: 1978, Code of practice for design of housing for the convenience of disabled people, *British Standards Institution*, 389 Chiswick High Road, London W4 4AL, United Kingdom.

British Standards Institution (1979) BS 5810: 1979, Code of practice for access for the disabled to buildings, British Standards Institution, 389 Chiswick High Road, London W4 4AL, United Kingdom.

British Standards Institution (2001) BS 8300: 2001 Design of buildings and their approaches to meet the needs of disabled people — Code of Practice. British Standards Institution, 389 Chiswick High Road, London W4 4AL, United Kingdom. *This standard only makes two references to children, one explicitly stating that it does not make recommendations relating to the use of buildings by children. The second relates to pre-meters being accessible but protected so that children cannot tamper with them. There are a number of comments made by standards committee members about how the standard might be adapted to the needs of children and children with disabilities.*

British Standards Institution (2005) BS 7000-6:2005. Design management systems – Part 6: Managing inclusive design – Guide, British Standards Institution, 389 Chiswick High Road, London W4 4AL, United Kingdom.

British Standards Institution (2006) BS 6465:2006 Sanitary installations – Part 1: Code of practice for the design of sanitary facilities and scales of provision of sanitary and associated appliances, Part 2: Code of practice for space requirements for sanitary appliances, Part 3: Code of practice for the selection, installation and maintenance of sanitary and associated appliances. British Standards Institution, 389 Chiswick High Road, London W4 4AL, United Kingdom.

Building Bulletin 77 (2005) Designing for pupils with special educational needs and disabilities in schools, Department for Education and Skills. http://www.dfes.gov.uk/consultations/conResults.cfm?consultationId=1335*. This document offers guidance on the planning, briefing and designing of school accommodation across all educational settings where there are pupils who have SEN and disabilities. These pupils have rights under the Children Act 2004 and the Disability Discrimination Act 1995 (DDA) as amended by the SEN and Disability Act 2001 (SENDA) (Part 4: Education). These Acts establish the health, safety and welfare of all pupils and entitlement to education as paramount.*

Building Bulletin 91 (1999) Designing for pupils with special educational needs and disabilities in schools, Department for Education and Skills, ISBN 0 11271 062X.

Building Bulletin 93 (2003) Acoustic design of schools, Department for Education and Skills, London: The Stationery Office, ISBN 011 271105 7. http://www.teachernet.gov.uk/management/resourcesfinanceandbuilding/schoolbuildings/designguidance/sbenvironmentalhs/acoustics/ and http://www.soundresearch.co.uk/Building%20Bulletin%2093%20-%20Schools.pdf
Contains detailed recommendations for designing for people with special hearing requirements. Contains 2 case studies which look at schools for deaf children and hearing impaired children. These are standards that are detailed within the Building regulations (2000) Education regulations (1999). The aim of Building Bulletin 93 is to provide a comprehensive guide for architects, building control bodies, building services engineers, clients, and others involved in the design of new school buildings.

Building Bulletin 94 (2001) Designing for pupils with special educational needs and disabilities in schools, Department for Education and Skills. ISBN 0 11271 109X

Building Regulations (2004) The Building Regulations 2000, Approved document M: Access to and use of buildings, 2004 edition, National Building Specification (NBS) for the Office of the Deputy Prime Minister (now Department for Communities and Local Government, DCLG) http://www.thenbs.com/BuildingRegs/, http://www.ribabookshops.com/site/viewtitle.asp?sid=&pid=4374 and http://www.planningportal.gov.uk/england/professionals/en/400000000988.html

Casey, G. and Dockrells, S. (1996) A pilot study of the weight of schoolbags carried by 10-year old children, Physiotherapy Ireland, 17 (2), p17-21. *This paper details the effects heavy backpacks have on children and the cause and prevention of lower back pain. There is no mention of disabled children in this publication.*

CEN Guide 12 (2006) Child Safety, Guidance for its Inclusion in Standards. European Committee for Standardizardization, Rue de Stassartstraat, 36, B - 1050 Brussels.
http://www.cenorm.be/BOSS/supporting/reference+documents/cenguide120606.pdf

CEN/CENELEC Guide 6: 2002. Guidelines for standards developers to address the needs of older persons and persons with disabilities, European Committee for Standardizardization and European Committee for Standardizardization, Rue de Stassartstraat, 35-36, B - 1050 Brussels.
http://www.cenorm.be/BOSS/supporting/reference+documents/cclcgd006.pdf

CEN/TC 136 SC1 (2005). Barrier-free playground equipment – Safety requirements and test methods, European Standard Work Item, Prepared by the Technical Committee AA14.7." Barrier-free playground equipment", of the Standard Committee "Sports, playground and other recreational equipment" within the DIN German Standards Organisation.

CEN/TC 207 prEN 1729 (2004) part 1: Chairs and tables for educational institutes. Part 1 functional dimensions. Part 2 Safety requirements and test. European Committee for Standardizardization, Rue de Stassartstraat, 36, B - 1050 Brussels. *This is the new European standard on educational furniture that is to be implemented shortly.*

Centre for Accessible Environments (2004) Designing for accessibility, 2004 edition. 2004; pp.1-70, London: CAE. *This new edition of Designing for Accessibility is an up-to-date and user-friendly good practice guide based on the 2004 Approved Document M and BS 8300:2001. The document contains an easy to read review of the Disability Discrimination Act (1995) and the different parts of it (Part 1: General, Part 2: Employment, Part 3: Provision of Services and Part 4: Education). In the context of the Act, it includes extensive plans and dimensional data illustrating internal and external features that commonly need attention in public buildings e.g. designation and size of parking bays for people with reduced mobility, path dimensions for wheelchairs, external ramps, street furniture, corridors, counters, etc. The design recommendations occasionally go beyond those specified in Part M and BS 8300, reflecting good practice derived from user experience, good design and, where possible, empirical research. There does not appear however to be any advice specifically related to children with disabilities.*

Centre for Accessible Environments (2005) Access Audit Handbook, CAE/RIBA ISBN: 1 85946 177 8 *Handbook aimed at access professionals. It describes service providers duties under the DDA (!995), explains the role of access audits and shows how they are carried out. It also describes the way the findings of an audit are fed back to the client in written reports and face-to-face meetings. This is to be used in conjunction with CAE/RIBA's Designing for accessibility handbook. Again there does not appear to be anything specifically related to children with disabilities. Access Audit Handbook DVD (2005) – Access audits a planning tool for business. The DVD looks at access to shops/service providers whether they are a business or a free service. It focuses on access for disabled people, there is no mention of children with disabilities. Refers to BS8300; 2001 Design of buildings and their approaches to meet the needs of disabled people, Code of practice.*

Communities and Local Government: (2005) Planning and access for disabled people: a good practice guide. 26th January 205.
http://www.communities.gov.uk/index.asp?id=1144644

Centre for Studies on Inclusive Education (2006) Index for inclusion: developing learning and participation in schools, Centre for Studies on Inclusive Education (CSIE), New Redland, Frenchay Campus, Coldharbour Lane, Bristol, BS16 1QU. http://inclusion.uwe.ac.uk/csie/indexlaunch.htm.

Childata (1995) Childata - The handbook of child measurements and capabilities - Data for design safety. Authors: Beverley Norris and John Wilson, Institute for Occupational Ergonomics at Nottingham University on behalf of the Consumer Safety Unit, DTI, June 1995, ISBN: 0-9522-571-1-4.

Cliff, K. and Li, H. (1983) Children in danger: accidents in the home. Nursing Mirror, 1, 8.

Confederation of Family Organisations in the European Communities, COFACE (1991) For the safety of our children - The initiatives of the European Commission and the awareness projects of the family organisations: for the safety of our children. 1991; Brussels: COFACE. *This booklet describes the problem of child safety and accidents to children with supporting statistics, together with descriptions of EC projects addressing this issue.*

Culvenor, J. F. (2002) Design of childproof barriers to prevent falls from a height in public places (2002) – study based in Australia. *This paper highlights the risk of children falling from a height in public places. Injury statistics and points of law are noted and examples of poor design are given. Good design features are discussed. It is stressed that conformance with building standards should be followed by regular assessment of public safety issues and action as appropriate.*

de Bruin, R. and Molenbroek, J. (2003). On the Development of a Friendly Restroom, Include 2003, London: Royal College of Art.

Department for Communities and Local Government (2005) Means testing, Department for Communities and Local Government (DCLG) News Release 2005/0215, 27 October 2005 http://www.communities.gov.uk/index.asp?id=1002882&PressNoticeID=1978 *Families in England needing to adapt their homes to care for a disabled child will no longer be subject to means testing from December 2005. The Government's decision makes it easier for families to apply for a Disabled Facilities Grant (DFG) to get funding for help to provide access ramps, stair lifts, level access showers and home extensions. The change, which ensures families are entitled to apply for the maximum grant available without having to go through a means test, will mean they can now apply for up to £25,000 for disability improvements to their home.*

Department for Education and Skills (2002a) Accessible schools: Planning to increase access to schools for disabled pupils, The Schools and Disability Access Team, Department for Education and Skills, Sanctuary Buildings, Great Smith Street, London, SW1P 3BT. 14 January 2002. Available from: http://www.teachernet.gov.uk/_doc/2220/Access_Guide_.doc

Department for Education and Skills (2002b) Consultation on Accessible Schools: Planning to increase access to schools for disabled pupils. Department for Education and Skills, Sanctuary Buildings, Great Smith Street, London, SW1P 3BT http://www.dfes.gov.uk/consultations/conResults.cfm?consultationId=1170. *This is a consultation document containing draft guidance for LEAs and schools on the new duty to plan to increase progressively the accessibility of schools to disabled pupils (the planning duty) which came into force in September 2002.*

Department for Education and Skills (2004) Removing barriers to achievement – The Government's strategy for SEN (Special Educational needs). Doc: DfES/0117/2004, DfES Publications, PO Box 5050, Sherwood Park, Annesley, Nottingham NG15 0DJ.

Department for Education and Skills (2006a) Promoting Disability Equality in
Schools, Draft Word version available at:
http://www.teachernet.gov.uk/wholeschool/sen/disabilityandthedda/guidancedis
abilityequalityinschools/

Department for Education and Skills (2006b) Implementing the Disability
Discrimination Act in schools in the early years. In collaboration with the
Disability Rights Commission. DfES publications, PO Box 5050, Sherwood
park, Annesley, Nottingham NG15 0DJ. Ref: 0160-2006DEC-EN. Written
guidance contained in this resource pack can be downloaded at:
http://publications.teachernet.gov.uk by searching on appropriate keywords.

Department for Transport (2005) Inclusive mobility: A guide to best practice on
access to pedestrian and transport infrastructure. Published: 1 November 2002.
Updated: 13 July 2005.
http://www.dft.gov.uk/stellent/groups/dft_mobility/documents/page/dft_mobility_
503282.hcsp

Department for Transport (2006) Statutory Instrument 2006 No. 1094, The Disability
Discrimination Code of Practice (Supplement to Part 3 Code of Practice)
(Provision and Use of Transport Vehicles) (Appointed Day) Order 2006.
Available from: http://www.opsi.gov.uk/si/si2006/20061094.htm

Department of Health (2002) Residential Special Schools - National Minimum
standards and Inspection Regulations, London: TSO 2002.

Department of the Environment, Transport and the Regions (2006) DETR, Great
Britain. Building Regulations, Approved document M: Access to and use of
buildings (2006 edition), London: Stationery Office.
http://www.planningportal.gov.uk/england/professionals/en/4000000000988.html

Dinkevich, E. I., Cunningham, S. J., and Crain, E. F. (1996) Parental perceptions of
access to care and quality of care for inner-city children with asthma. Journal of
Asthma, *36th Annual Meeting of the Ambulatory-Pediatric-Association /Society-
for-Pediatric-Research,* May 6-12, 1996, Washington, D.C. *The objective of this
study was to describe perceptions of asthma care, morbidity, and health service
utilization by parents of children with asthma presenting to an inner-city emergency
department* (ED).

Disability Discrimination Act (1995, 2005) The Disability Discrimination Act (DDA),
Office of Public Sector Information (OPSI), St. Clements House. 2-16 Colgate.
Norwich. NR3 1BQ, UK. http://www.opsi.gov.uk,
http://www.opsi.gov.uk/acts/acts1995/1995050.htm and
http://www.direct.gov.uk/DisabledPeople/RightsAndObligations/YourRights/You
rRightsArticles/fs/en?CONTENT_ID=4001068&chk=eazXEG *The Disability
Discrimination Act (DDA) aims to end the discrimination that many disabled people
face. This Act (1995) gives disabled people rights in the areas of employment,
education, access to goods, facilities and services, buying or renting land or property.
The Act also allows the government to set minimum standards so that disabled people
can use public transport easily. An extension to the act (2005) helps disabled tenants,
HIV, cancer and multiple sclerosis. It also ensures that private clubs with 25 or more
members cannot keep disabled people out and requires public bodies to promote
equality of opportunity for disabled people. Others changes came into force in
December 2006 - the Disability Rights Commission (DRC) website has more details on
these.*

Disabled Persons Transport Advisory Committee (2006) Meeting the needs of
disabled travellers A guide to good practice for real-time information systems
providers RTIG Library Reference: RTIGPR003-D002-1.1 June 2006
http://home.btconnect.com/centaurconsult/rtig/Documents/RTIanddisabledtravel
lers.pdf

Disability Rights Commission (2006) Code of Practice: Provision and use of transport vehicles, DRC Helpline, FREEPOST MID02164, Stratford upon Avon, CV37 9BR. http://www.drc-gb.org/library/publications/services_and_transport/provision_and_use_of_transport.aspx.

Dumas, J. S. and Redish, J. C. (1994) A Practical Guide to Usability Testing, Ablex Publishing, Norwood, NJ. *Guides the reader step by step through all the important considerations when planning, preparing, conducting and evaluating the results from a usability test. It is concise and provides relevant examples and cases that hint to the many possible obstacles when executing a usability test. This book offers guidance on preparing evaluation reports structuring the test's findings.*

Equal Treatment of Students at Universities Act (2001) Equal Treatment of Students at Universities Act 2001:1286, Equal Opportunities Ombudsman, Jämställdhetsombudsmannen, Box 3397, S-103 68 Stockholm, Sweden. http://195.149.159.99/en/equaltreatmento.asp

European Commission (1996) Communication of the Commission on equality of opportunity for people with disabilities, A New European Community Disability Strategy. *EC Communication COM(96) 406 final of 30 July 1996.* http://www.disabilitaincifre.it/allegati/COM(96)406_en.rtf

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European Telecommunications Standards Institute (2003a) ETSI TR 102 133 V1.1.1 (2003-04) Human Factors (HF): Access to ICT by young people: issues and guidelines, ETSI Secretariat, 650, route des Lucioles, 06921 Sophia-Antipolis Cedex, France. http://www.etsi.com/services_products/freestandard/home.htm

European Telecommunications Standards Institute (2003b) ETSI TR 103 073 V1.1.1 (2003-11) Universal Communications Identifier (UCI): Improving communications for disabled, young and elderly people, ETSI Secretariat, 650, route des Lucioles, 06921 Sophia-Antipolis Cedex, France. http://www.etsi.com/services_products/freestandard/home.htm

European Telecommunications Standards Institute (2005a) ETSI EG 202 423 V1.1.1 (2005-10) Human Factors (HF): Guidelines for the design and deployment of ICT products and services used by children, ETSI Secretariat, 650, route des Lucioles, 06921 Sophia-Antipolis Cedex, France. http://www.etsi.com/services_products/freestandard/home.htm

European Telecommunications Standards Institute (2005b) ETSI SR 001 996 V3.1.1 (2005-12) Human Factors (HF): An annotated bibliography of documents dealing with Human Factors and disability, ETSI Secretariat, 650, route des Lucioles, 06921 Sophia-Antipolis Cedex, France. http://www.etsi.com/services_products/freestandard/home.htm

Floyd, W.F., and Ward, J. S. (1969) Anthropometric and physiological considerations in school, office and factory seating. Ergonomics, 12 (2), p132-139.

Gillinson, S. and Green, H. (2006) DEMOS: Beyond Inclusion: It's not just bricks and mortar. Article: 9 August 2006. URL http://www.demos.co.uk/projects/beyondinclusion/themes/~casestudy *Discussion about inclusion in schools with useful case studies reported.*

Gouvali, M. K. and K. Boudolosa, K. (2006) Match between school furniture dimensions and children's anthropometry, Sport Biomechanics Laboratory, Department of Sport Medicine and Biology of Physical Activity, Faculty of Physical Education and Sport Science, University of Athens, Greece. Applied Ergonomics, 2006; 37, 6, 765-773, November 2006, Available online 26 January 2006. http://www.sciencedirect.com/ (search on author: 'Gouvali'). *The purpose of the study was to examine whether school furniture dimensions match children's anthropometry. Children aged 6–18 years (n=274), divided into 3 groups on the basis of the used furniture size, were subjected into anthropometric measurements (shoulder, elbow, knee and popliteal height, buttock-popliteal length and hip breadth). Combinational equations defined the acceptable furniture dimensions according to anthropometry and match percentages were computed, according to either the existing situation—where children use the size assigned for their grade—or assuming that they could use the most appropriate of the sizes available. Desk and seat height were bigger than the accepted limits for most children (81.8% and 71.5%, respectively), while seat depth was appropriate for only 38.7% of children. In conclusion, the assumption that children could use the most appropriate yet available size significantly improved the match, indicating that the limited provision of one size per cluster of grades does not accommodate the variability of anthropometry even among children of the same age.*

Hänninen, O. (2003) Adjustable tables and chairs correct posture and lower muscle tension and pain in high school students. *The aim of this study was to compare the effects of the traditional non-adjustable and new adjustable school tables and chairs on the sitting and standing postures, muscle tension and pain levels as well as the learning success during the three high school years when the growth of the students reaches the adult measures. There is no mention of disabilities here.*

Harrell, W. A., and Reid, E. E. (1990) Safety of children in grocery stores: The impact of cartseat use in shopping carts and parental monitoring. *Accident Analysis and Prevention*, Pergamon Press plc. 1990; 22, 6, 531-542. *Study observed preschool children accompanied by an adult in grocery stores. Adults were observed to leave children unattended on many occasions. Supervision is critical in preventing contact with hazards if children not confined to cart seats. Child's age found to be a factor in predicting handling of hazards.*

Harris, C (2000) Survey of physical ergonomics issues associated with school children's' use of laptop computers. *The survey investigated the use of laptop computers by children aged 10 to 17 years at schools in Western Australia. 60% of students reported discomfort with laptop use and 61% of participants reported discomfort with carrying their laptop. Associations between school attended or year level with time on task and discomfort reports were evident. However there is no mention of children with disabilities.*

Heaton, J., Noyes, J., Sloper, P., and Shah, R. (2005) Families' experiences of caring for technology-dependent children: a temporal perspective, Health & Social Care in the Community. Blackwell Publishing, Oxford. 13, 5, 441-450. http://www.blackwell-synergy.com/links/doi/10.1046/j.1365-2214.1998.00043.x/abs/ *Families' experiences of caring for a technology-dependent child were examined over time. Devices included feeding pumps, suction machines, dialysis machines and ventilators. Using mainly qualitative methods, children, parents and siblings were interviewed to establish what the care routines involved and how these impacted on family members. The need to use and oversee the use of some medical technologies at night also meant that many parents suffered regular disruption to their sleep. In conclusion, the authors argue that the care of technology-dependent children at home places considerable time demands on families. The study found that families have little or no access to suitably trained carers who can provide technical care required in the home or away from the home to give parents and the whole family a break from caring where required. More trained carers and short-term care provision, better coordination of services and improvements in the design of devices would all help to reduce the negative effects of the care routines on families.*

Hunter, W. M., Helou, S., Saluja, G., Runyan, C. W., Coyne-Beasley, T. (2005) Injury prevention advice in top-selling parenting books. November 2005, *Amer Acad Pediatrics*, Elk Grove Village, Pa 141 North-west Point Blvd, IL 60007-1098 USA. *Parenting books are a commonly used source of information on how to keep children and adolescents safe from injuries, the leading cause of death and disability for children aged 1 to 18 years. The content and the quality of the messages contained in these books have not been evaluated formally. The objective of this study was to determine the quantity and the quality of injury prevention messages contained in popular parenting books.*

Huwiler, H. and Martens, A. (2006) Development and testing of school furniture suitable for disabled pupils, *IEA,* 10-14 July 2006, Pikaar, R.N., Koningsveld, E.A.P. and Settels, P.J.M. (Eds.) Elsevier Ltd. *Participatory study to design new school furniture. After testing standard desks and chairs a new product was developed with a manufacturer. Feedback indicates a high rate of satisfaction.*

International Organization for Standardization (2001) ISO/IEC Guide 71, Guidelines for standards developers to address the needs of older persons and persons with disabilities, International Organization for Standardization (ISO), 1, rue de Varembé, Case Postale 56, CH-1211 Geneva 20, Switzerland.

International Organization for Standardization (2002) ISO/IEC 50:2002, Safety aspects - Guidelines for child safety, International Organization for Standardization (ISO), 1, rue de Varembé, Case Postale 56, CH-1211 Geneva 20, Switzerland.

International Organization for Standardization (2006) ISO/TC 59/SC 16/WG 1, Draft Proposal 2nd ISO/CD 21542, Building construction — accessibility and usability of the built environment, Secritariat: AENOR, International Organization for Standardization (ISO), 1, rue de Varembé, Case Postale 56, CH-1211 Geneva 20, Switzerland.

Jacobs, K. (2002) Are Backpacks Making Our Children Beasts of Burden?

Jeong, B.Y. and Park, K. S., (1990) Sex differences in anthropometry for school furniture design. Ergonomics, 33 (12), 1511-1521.

John, A. and Wheway, R. (2004) Can play will play, The National Playing Fields Association (NPFA), St. Chad's Place, London WC1X 9HH http://www.npfa.co.uk/content/playforchildren/index.html.

Joseph Rowntree Foundation (2006) Inclusion of disabled children in primary school playgrounds. January 2006, Ref 0016. http://www.jrf.org.uk/knowledge/findings/socialpolicy/0016.asp *Based on qualitative research focusing on disabled children, this study investigated the play in playgrounds of six schools in Yorkshire. It reveals how disabled children were included in play and identifies both organisational, social and physical barriers and good practice to the inclusion of these children in play at both playtimes and lunch-times.*

Katz, J, N (2001) Computer associated upper extremity symptoms and disability in college students: prevalence, risk factors, impact and strategies for prevention (presentation). *This is only a presentation but would appear to cover disabilities associated with computer use.*

Knight, G. and Noyes, J. (1999) Children's behaviour and the design of school furniture. Ergonomics, 42 (5), p747-760.

Kroemer, K. H. E. (2006) Designing for "extra-ordinary people": Disabled and elderly, expectant mothers and children, Taylor and Francis and HFES, ISBN: 0-8493-3668-6. *Customarily we devise workplaces and homes, machines and jobs for normal adults of regular size with standard abilities. This design habit makes life hard for those among us who are "extra-ordinary" by being bigger, smaller, weaker, or less able to move than "ordinary" people are. Children and expectant mothers, disabled persons and the elderly need special ergonomic designs that suit them. This paper lays out strategies for assessing their specific requirements, and then to design habitats, work places and equipment that meet their needs.*

Li, L. P. (2003) A survey on injury incidence in school children in Shantou City, China. Biomedical and Environmental Sciences, Volume: 16, Issue: 2, Pages: 180-186. http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=12964792&dopt=Abstract. *Aim was to study incidence characteristics and causes of injury, and its medical consequences in school children of China. Study concluded that currently, injury has become one of the serious public health problems in China. For the improvement of children survival, it is crucial to reduce their injury to strengthen research on child safety and to implement safety-promotion programs.*

Linton, S.J., Hellsing, A.L., Halme, T., and Akerstedt, K. (1994) The effects of ergonomically designed school furniture on pupils' attitudes, symptoms and behaviour. Applied Ergonomics, 25 (5), p299-304.

Long K. (2000) Access rights enforced: The new disability rights commission will be able to prosecute architects whose buildings do not cater for disabled visitors. 2000; pp.1-4. Building Design. 1438.

Maguire, M., Elton, E., Osman, Z., Nicolle, C. (2006) Design of a virtual learning environment for students with special needs, in Human Technology: An Interdisciplinary Journal on Humans in ICT Environments, Special issue on 'Human technology for special needs', Guest Editor Jóse Cañas, April 2006. http://www.humantechnology.jyu.fi/archives/april06.html

Mayhorn, C. B., Wogalter, M. S. and Mender, C.C. (2006) The matching game: Educating children about household hazards and warning symbols, Pikaar, R.N., Koningsveld, E.A.P. and Settels, P.J.M. (Eds.) International Ergonomics, 10-14 July 2006, Elsevier Ltd. *Study carried out with children to identify hazards using pictorial symbols and matching them to household items. Performance illustrated that children could acquire safety information after being provided with definitions of the symbol and were able to pair them with appropriate household items.*

McConachie, H. et al. (2006). Participation of disabled children: How should it be characterised and measured? Disability and Rehabilitation, September, 28 (18); 1157-1164. file://\\fordgt\intranet\library\pdf\DAR 28 18 1157 Participation of disabled children.pdf

Mitchell, W. and Sloper, P. (2000) User-friendly information for families with disabled children: a guide to good practice, Joseph Rowntree Foundation, York, tel. +44 (0)1904 629241 and http://www.jrf.org.uk/bookshop.

Morisette, L. (2006) Better living in a child's world. Pikaar, R.N., Koningsveld, E.A.P. and Settels, P.J.M. (Eds.) IEA, 10-14 July 2006, Elsevier Ltd IEA, 10-14 July 2006, Elsevier Ltd. *Case study to integrate staff health and safety concerns into newly designed or renovated day centre buildings.*

National Disability Authority (2002a) People's attitudes to disability in the Republic of Ireland, National Disability Authority, 25 Clyde Road, Dublin 4, Ireland. http://www.nda.ie/cntmgmtnew.nsf/0/910C72601D161DE580256CCC005373D5/$File/attitude.pdf

National Disability Authority (2002b) Building for Everyone (detailed technical recommendations are spelled out in the body of this submission). National Disability Authority, 25 Clyde Road, Dublin 4, Ireland. http://www.nda.ie/cntmgmtnew.nsf/0/EBD4FB92816E8BB480256C830060F761?OpenDocument

National Disability Authority (2003) Review of access to mental health services for people with intellectual disabilities, 25 Clyde Road, Dublin 4, Ireland.

National Disability Authority (2004) Towards best practice in the provision of transport services for people with disabilities in Ireland, National Disability Authority, 25 Clyde Road, Dublin 4, Ireland. http://www.nda.ie/cntmgmtnew.nsf/0/05F69E6DCA8CBFE580256E6300311E57?OpenDocument

National Disability Authority (2005a) Transport Guidelines Document, National Disability Authority, 25 Clyde Road, Dublin 4, Ireland, September 2005 http://www.nda.ie/cntmgmtnew.nsf/0/C0DBA1BA241FB9398025710F004D8EAA?OpenDocument

National Disability Authority (2005b) International Experience in the Provision of Individual Education Plans for Children with Disabilities. National Disability Authority, 25 Clyde Road, Dublin 4, Ireland. http://www.nda.ie/cntmgmtnew.nsf/cntmgmtnew.nsf/0/393FEBD9B935DE01802570660054EC18?OpenDocument.

National Disability Council. (1995) Disability Discrimination Act 1995: A consultation by the National Disability Council on their proposals for a code of practice about rights of access to goods, facilities, services and property. 1995; DL 140. London, NDC.

National Health Service (2004) National Service Framework (NSF) for Children, Young People and Maternity Services. Department of Health in England, Richmond House, Whitehall, London SW1 http://www.dh.gov.uk/PolicyAndGuidance/HealthAndSocialCareTopics/ChildrenServices/ChildrenServicesInformation/fs/en

Newacheck, P.W., Inkelas, M., Kim, S.E. (2004) Health services use and health care expenditures for children with disabilities, Pediactrics, Vol. 114, Issue 1, pp 79-85. *The study examined health care utilization and expenditure patterns for children with disabilities. The skewed distribution of out-of-pocket expenses found in this and earlier studies indicates that the financial burden of childhood disability continues to be shared unevenly by families. Low-income families are especially vulnerable to burdensome out-of-pocket expenses. Additional efforts are needed to protect these high-risk families.*

Nicolle C. (1997) Telematic standards and coordination of ATT systems in relation to elderly and disabled travellers. Transport Telematics project no TR 1108. Draft guidelines concerning elderly and disabled issues, Deliverable D5.1. Commission of the European Communities,1997; 1-117.

Nicolle, C. and Burnett, G.E. (2001) Accessible Systems for Transport. In Inclusive Design Guidelines for HCI, Nicolle, C. and Abascal, J. (eds), Taylor and Francis, London. ISBN 0-7484-0948-3

Nielsen, G. S. and Irval, B. (2005) Access to libraries for disabled persons checklist: a practical tool. World Library and Information Congress: 71sth IFLA General Conference and Council, "Libraries – a voyage of discovery" August 14th-18th 2005, Oslo, Norway. http://www.ifla.org/IV/ifla71/papers/113e-Nielsen_Irval.pdf

Nielsen, J. (1994) Usability Engineering, Morgan Kaufmann, San Francisco, ISBN 0-12-518406-9. *This book is an excellent guide to the methods of usability engineering. It provides the tools needed to avoid usability surprises and improve product quality. Step-by-step information on which method to use at various stages during the development lifecycle are included, along with detailed information on how to run a usability test and the unique issues relating to international usability.*

Norris, B. J. and Wilson, J. R., (1988), Child Safety: Where are the data the designers need? In: Contemporary Ergonomics, Proceedings of the Ergonomics Society's Annual Conference, Manchester, Taylor and Francis, pp202-207. *A databank has been produced containing the existing physical, perceptual, sensory and cognitive data relevant to designing for children. It is intended that an accessible, assessed and usable collection of data will increase the use of ergonomics in design. The production and form of this databank is described and also the problems encountered, including inadequacies in existing data and gaps that need to be filled.*

Oates, S., Evaizs, G. W. and Hedge, A. (1999) An anthropometric and postural risk assessment of children's school computer work environments. Computers in the Schools, 14 (3/4), 55-63.

Office of the Deputy Prime Minister (2003) Developing accessible play space, Office of the Deputy Prime Minister (ODPM). Product code: 03UPU01737. Available from ODPM Publications, PO Box 236, Wetherby, West Yorkshire, LS23 7NB. web:http://www.communities.gov.uk/pub/763/DevelopingaccessibleplayspaceagoodpracticeguidePDF766Kb_id1127763.pdf

Oxford, H.W. (1969) Anthropometric data for educational chairs. Ergonomics, 12 (2), 140-162.

Page M. (1986) Child safety and housing: practical design guidelines for commissioning agencies, architects, designers and builders. Compiled for the Child Accident Prevention Trust, Bedford Square, London 1986. ISBN: 0-7-199 11613. *Illustrated practical advice covering circulation spaces, kitchens, bathrooms, rooms generally and outdoors. Components covered include windows and glass, doors, heating equipment. Further sources of information and advice are also listed.*

Pain, H., Pascoe, J., Gore, S., et al. (1996) Multi-Adjustable Chairs for Children with Disabilities, *Journal of Medical Engineering & Technology,* ISSN: 0309-1902, 20, 4 to 5, 151-156. *There is a growing demand that severely disabled children should be offered a normal-looking, comfortable alternative to highly supportive wheelchair seating to facilitate relaxation and social integration. A study with children using wheelchairs was performed to compare a set of chairs to asses whether they met postural needs, provided adjustability and provided special features; evidence of poor design and its implications are discussed.*

Parkin, D. (1981) Taking a closer look at child accidents. Care in the Home 1981, 17-9.

Pelland, L and Mckinley, P. (1997) The Montreal Rehabilitation Performance Profile: A task-analysis approach to quantify stair descent performance in children with intellectual disability. Archives of physical medicine and rehabilitation, 27th Annual Meeting of the Society-of-Neuroscience, Oct 25-30, 1997, New Orleans, Louisiana. *This paper develops a clinical tool to quantify stair descent performance in children with moderate to severe intellectual disability.*

Petridou, E., Kedikoglou, S., Andrie, E., Farmakakis, T., Tsiga, A., Angelopoulos, M., Dessypris, N. and Trichopoulos, D. (2003) Injuries among disabled children: a study from Greece. Injury Prevention, BMJ Publishing Group, 9, 226-230. http://ip.bmj.com/cgi/content/full/9/3/226

Pheasant, S. (1987) *Ergonomics: standards and guidelines for designers.* 1987; London. British Standards Institution. ISBN: 0580-1539-16.

Preiser W. F. E. and Ostroff E. (2001) Universal design handbook plus CD. 2001; 1-69.18. McGraw-Hill. *This Handbook is reference to designing for ADA and other standards, both American and international. Its comprehensive coverage includes accessibility for the disabled, the elderly, and children and encompasses vision, touch, cognitive impairment, and hearing as well as motor impairment. Residential, commercial, office, and educational facilities are included, plus outdoor areas, products and furniture, and access to telecommunications, electronics, and the internet. CD includes newest ADAAG and other graphic standards, ready for downloading into drawings - an often requested feature - as well as reusable checklists for different building types and both renovation projects and new construction.*

Prohibition of Discrimination Act (2003) Prohibition of Discrimination Act 2003:307, The Government and the Government Offices of Sweden, 103 33 Stockholm, Sweden. http://www.sweden.gov.se/content/1/c6/03/07/73/c6e1d81e.pdf

Rahim, A. A. (2005) Barrier free architecture, universal design, accessibility and inclusive design - are there accessible. In: Wang, Y. (Ed.), Proceedings of the International Conference on Construction and Real Estate Management, Volumes 1 and 2. **Challenge of innovation in construction and real estate**, 12-13, 2005, Penang, Malaysia. *The objectives of this paper are to (1) discuss concepts, approaches and terminologies used to describe accessibility in the built environment; (2) to identify facilities used to achieve accessibility for the above users safely and if possible independently; (3) to describe the methodology used including simulation and access audit to test weathers the facilities provided are in accordance to the minimum standards and the codes of practice provided locally or abroad.*

Ramirez, M., Peek-Asa, C. and Kraus, J. F. (2004) Disability and risk of school related injury, Injury Prevention 2004;10, 21-26, BMJ Publishing.

Reneland, M. (2005) Accessibility calculations in six Swedish towns, In: Kungolos, A., Brebbia, C.A., Beriatos, E. (Eds), Sustainable development and planning II, Vols 1 and 2, WIT Transactions on ecology and the environment, 2nd International Conference on Sustainable Development and Planning, Sep 12-14, 2005, Bologna, Italy. *The Swedish National Road Administration (Vagverket) has financed the development of a GIS-method (Geographic Information System) to analyze different users' accessibility to different facilities in real footway, cycleway, public transport and car networks. The focus is on the standard setting user groups (children, elderly and the disabled) in Swedish transport policy as well as on women and their assumed demands concerning safety, security and comfort in foot- and cycleway networks.*

Repkova, K. (2005) Children with disabilities as citizens or from charity towards citizenship and human rights. Sociologia - Slovak Sociological Review. 2005; 37, 6, 509-528. Web (Slovak Academy of Sciences database): http://www.sav.sk/index.php?lang=en&charset=ascii&doc=publish-journal&part=list_articles&journal_issue_no=1539#abstract_2885 *Children with disabilities as citizens or from charity towards citizenship and human rights. Article encourages research and new-fashioned projects focused on wider living conditions of children and young people with disabilities based on their human rights and promotes exchange of experience and good practices in this field. To stress importance of the mentioned effort author analyses selected facts about living conditions of children with disabilities. She develops a psychology–based polemic to premises about special needs of children and young people with disabilities, and presents the demands–based approach to human needs based on social–right model of disability. Second part of the study pays attention to situation in Slovenia – incidence of disability among children and some structural features of the Slovak disability research with emphasizing the research work focused on the field of education.*

Riczker, P, Ryan, S., Campbell, K and Bortolussi, J. (2005) Adaptive seating for young children: Parent's perception of injury risk in the bathtub. Technology and Disability, 17, 165-171, IOS Press.

Roberts and Norton (1995) Sensory deficit and the risk of pedestrian injury, Injury Prevention, 1995; 1, 1, 12-14, BMJ Publishing. http://ip.bmj.com/cgi/content/abstract/1/1/12?maxtoshow=&HITS=10&hits=10& RESULTFORMAT=&searchid=1&FIRSTINDEX=20&minscore=5000&resourcet ype=HWCIT&eaf

Rogerson, F., Mc Namara, M., Winters J., and Marsh, K. (2005) A Review of the Effectiveness of Part M of the Building Regulations, Dublin: National Disability Authority and Fionnuala Rogerson Architects. http://www.nda.ie/cntmgmtnew.nsf/0/20DF93378F6803108025715A004EAA2D/ $File/nda_part_m_submission_01.htm

Samová, M., Puškár, P., Mikulová, Z. (1999) Bývanie bez bariér, architektonická príručka navrhovania rodinných domov a bytov pre osoby s obmedzenou schopnosťou pohybu. Prvá stavebná sporiteľňa, (Houses for disabled / architectural manual of family houses for disabled)

Samová, M., Puškár, P. (1997) Bezbariérová architektonická tvorba z hľadiska nevidiacich a slabozrakých osôb. Metodická príručka, Únia nevidiacich a slabozrakých Slovenska, Sekulská 1, 84250 Bratislava, (Architectural design for disabled / methodological guidelines)

Save the Children (2001) Disabled children's rights – a practical guide, Author: Hazel Jones, Save the Children Sweden, SE-107 88 Stockholm, ISBN: 91-89366-77-8, www.rb.se

Schenker, R.; Coster, W.; Parush, S. (2006) Personal assistance, adaptations and participation in students with cerebral palsy mainstreamed in elementary schools. Disability and Rehabilitation, September 2006; 28, 17, 1061-1069(9), Taylor & Francis, ISSN: 0963-8288. http://www.ingentaconnect.com/search/expand?pub=infobike://tandf/tids/2006/0 0000028/00000017/art00004 *The aims of this study were to examine differences in level of participation of students with CP in full inclusion (FI group) as compared to self-contained classes (SC group), differences in the task supports provided for these two groups, the interrelationships between assistance and adaptation provided and the differential impact of physical task supports vs. cognitive/behavioural task supports on participation. The study found that devices and cognitive and behavioural adaptations are required in a wider manner in addition or alternative to physical assistance by adults if we are to increase the chance of students with severe CP to become participatory for academic and social tasks required in school.*

SENDA (2001) SENDA: Special Educational Needs and Disability Act 2001, Office of Public Sector Information (OPSI), St. Clements House. 2-16 Colgate, Norwich, NR3 1BQ, UK, http://www.opsi.gov.uk/acts/acts2001/20010010.htm. Braille copies of this Act can also be purchased at the same price as the print edition by contacting TSO Customer Services on 0870 600 5522 or e-mail: customer.services@tso.co.uk. Further information available at: http://www.direct.gov.uk/DisabledPeople/EducationAndTraining/EducationArticl es/fs/en?CONTENT_ID=4001076&chk=AftwGD.

Sherrard, J., Tonge, B. J. and Ozanne-Smith, J. (2001) Injury in young people with intellectual disability: descriptive epidemiology. Injury Prevention 2001; 7,56-61, BMJ Publishing. http://ip.bmj.com/cgi/content/abstract/7/1/56?maxtoshow=&HITS=10&hits=10& RESULTFORMAT=&searchid=1&FIRSTINDEX=10&minscore=5000&resourcet ype=HWCIT&eaf

Simpson, J. (2006) Accessible Criterion to Meet Disabled Children's Needs, Paper presented at COBRA 2006, the construction and building research conference of the Royal Institution of Chartered Surveyors. University College London, 7-8 September

Smith-Jackson, Tonya L. (2002) Child-Centered Safety Research Issues, The Proceeding of the XVI Annual International Occupational Ergonomics and Safety Conference, (ISOES), Toronto, Canada, June 9-12, 2002. http://education.umn.edu/kls/ecee/pdfs/ChildCenteredSafetyResearchIssues_SmithJackson.pdf.*This paper is an overview of the important factors researchers should consider when conducting safety-related research that involves children. Important considerations derived from developmental psychology are discussed in terms of their application to efforts to elicit the needs, preferences, attitudes, and perceptions of children.*

Standards Australia (2001) AS 1428.1: 2001, Design for access and mobility - part 1: General requirements for access - new building work, Committee ME-064, Standards Australia, GPO Box 542, Sydney, NSW 2001, Australia

Standards Australia (1992a) AS 1428.2: 1992, Design for access and mobility - part 2: Enhanced and additional requirements – buildings and facilities, Committee ME-064, Standards Australia, GPO Box 542, Sydney, NSW 2001, Australia.

Standards Australia (1992b) AS 1428.3: 1992, Design for access and mobility - part 3: Requirements for children and adolescents with physical disabilities ME-064, Standards Australia, GPO Box 542, Sydney, NSW 2001, Australia.

Standards Australia (1992c) AS 1428.4: 1992, Tactile ground surface indicators for orientation for people of vision impairment ME-064, Standards Australia, GPO Box 542, Sydney, NSW 2001, Australia.

Stationery Office, The (2000) Building Regulations Technical Guidance Document M, Government Publications Sale Office, Sun Alliance house, Molesworth Street, Dublin 2, Ireland. http://www.environ.ie/DOEI/DOEIPol.nsf/0/a137e0322d60e09780256f5d00504a79/$FILE/30184%20BR%20Disabillity%20M.pdf

Sustrova, M. (2002) Parents, family and the child born with a disability. In Glasa, J, (Ed.) Ethics of human genetics: challenges of the (post) genomic era, International Bioethics Conference on Ethics of Human Genetics, Oct 23-24, 2002, Bratislava, Slovakia. *This paper argues that children and adults with disabilities should have access to the mainstream health, education, vocational and social services-and all the opportunities, which are available to non-disabled persons. It also asserts that the education system, therefore, has to be the key place to ensure personal development and social inclusion, which will allow children and youngsters with disabilities to be as independent, as possible.*

Swedish Handicap Institute (1990) Bo bra med rörelsehindrat barn. Förslag till bostadsanpassning (adaptation of dwellings for children with reduced mobility published), www.hi.se

Trtnik Herlec, A. (2000) Inclusion in Slovenia after the implementation of the new legislation, Proceedings of International Special Education Congress (ISEC 2000), University of Manchester, UK (http://www.isec2000.org.uk/abstracts/papers_t/trtnik_herlec_1.htm)

Tzoubadakes, I. (1986) Contribution in attempts to reduce child accidents within-house and within urban region in general. NTUA, Dept. Architecture, Athens. Technical Chronicles: Scientific Publication of TEE: Area A, 0250-9954 Jul-Sept 1986, vol. 6, issue 3, pp 119-154.

United Nations Educational, Scientific and Cultural Organization, UNESCO (2006) Guidebook for planning education in emergencies and reconstruction, Chapter 8, Children with disabilities. International Institute for Educational Planning, 7-9 rue Eugene Delacroix, 75116 Paris. ISBN: 92-803-1288-X. Website: www.unesco.org/iiep. Document: http://www.unesco.org/iiep/eng/focus/emergency/guidebook/Chapter8.pdf

United Nations Children's Fund, UNICEF (1990), Convention on the Rights of the Child, Headquarters, United States Fund for UNICEF, East 38th Street, (Mail Code: GC-6), New York, New York 10016. http://www.unicef.org/crc/

United Nations Children's Fund (1996) Situational analysis of the position of children and families in Slovenia, Ljubljana: Slovenian Committee for UNICEF.

Van Aken D and Van Weperen W. (1998) Guide 50: Child safety and standards: general guidelines. Revision of ISO/IEC guides 50 (child safety) and 51 (safety standards). 1998; p.3 Amsterdam. European Consumer Safety Association. (IN7). *This Guide establishes basic safety principles intended for technical bodies preparing national and international standard for products which intended specifically for use by children and products that children are likely to come into contact.*

Van Aken D. and Van Weperen W. (1998) Revision of ISO/IEC Guide 51 (safety standards). 1998; p3 Amsterdam. European Consumer Safety Association.

Warfield, M. E. and Gulley, S. (2006) Unmet need and problems accessing specialty medical and related services among children with special health care needs. *Maternal and Child Health Journal*, 10, 2, 201-216, New York: Springer/plenum Publishers. *Using data from a 1998-1999 20-state survey of families of CSHCN, the authors examined differences in parent report of need for services by child characteristics, investigated parent report of unmet need and access problems by service area and number of services needed, and estimated the likelihood of four access problems and unmet need by child, family, and health insurance characteristics.*

Weinstein, C.S. (1985) Seating arrangements in the classroom. In T. Huséun & T.N. Postlethwaite (Eds.), International encyclopedia of education, 103–145. New York: Pergamon.

Whitehurst, T. (2006) The impact of building design on children with autistic spectrum disorders, Good Autism Practice, G. Jones and H. Morgan (eds.) British Institute of Learning Disabilities, 2006, 7, 1, 31-38.

Whitney, G. (2006) Accessible road-based public transport information in the developed world, Internal document. 18 July 2006. Middlesex University, UK.

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20 Appendix 2: Standards related to people with disabilities and children

The following section provides a wide range of national and international standards. To highlight this, an image of the appropriate flag is presented below each section heading.

20.1 Australian standards

Publisher: Standards Australia, GPO Box 542, Sydney, NSW 2001, Australia

AS 1428.1: 2001
Design for access and mobility - part 1: general requirements for access - new building work, Committee ME-064
Specifies design requirements applicable to new building work in public and commercial buildings, to provide access for people with disabilities. The standard references other standards which go into more detail on each topic.

> *Contents*
> *Foreword*
> *1 Scope*
> *2 Application*
> *3 Referenced documents*
> *4 Definitions*
> *5 Walkways, ramps and landings*
> *6 Handrails and grabrails*
> *7 Doorways, doors and circulation space at doorways*
> *8 Lifts*
> *9 Stairways*
> *10 Sanitary facilities*
> *11 Controls*
> *12 Surface on a continuous accessible path of travel*
> *13 Car parking facilities*
> *14 Signs indicating access for people with disabilities*
> *15 Seating in places of public entertainment*
> *16 Hearing augmentation listening systems*
> *17 Lighting*
>
> *Appendices*
> *A Examples of kerbs*
> *B Angles of approach for walkways, ramps and landings*
> *C Circulation spaces at doorways on a continuous accessible path of travel*
> *D Luminance contrast*
> *E Example of shower recess and circulation space for three-sided shower enclosures*

AS 1428.3
Design for access and mobility - part 3: requirements for children and adolescents with physical disabilities, Committee ME-064
Sets out requirements for facilities specifically intended for use by children and adolescents with physical disabilities. Details on four age ranges (from 3 to 18 years of age) and disability groups are provided.

> *Contents*
> *Foreword*
> *1 Scope*
> *2 Application*
> *3 Referenced Documents*
> *4 Definitions*
> *5 Disability Groups*

6 Application of As 1428.2 to the Provision of Access For Children and Adolescents with
Physical Disabilities
7 Walkways, Ramps and Landings
8 Stairways
9 Handrails
10 Sanitary Facilities
11 Reach Ranges
12 Controls
13 Furniture and Fitments
14 Drinking Fountains
15 Vending Machines
16 Other Items Not Covered by this Standard

Appendices
A Horizontal Reach over a Bench Surface
For All Groups in all Age Ranges
B Vertical Reach above a Bench for all Groups in all Age Ranges
C Reach Along a Side Wall For all Groups in all age ranges
D Frontal reach for Group F, Group A and Group S
E Wheelchair and User Size

AS 1428:SUPP1 (possibly superseded)
Design for access and mobility - extracts - design rules for access by the disabled,
Committee ME-064.
Reproduces those clauses or parts of clauses of AS 1428 - 1977 which have not been superseded by
AS l428.l-l988 or deleted in their present form.

20.2 Austrian standards

Publisher ON:Osterreichisches Normungsinstitut, Heinestrasse 38,
Postfach 130, A-1021 Wien, Austria

ÖNORM EN 179
Building hardware - emergency exit devices operated by a lever handle or push pad -
requirements and test methods
Quincaillerie Pour Le Batiment - Fermetures D'urgence Pour Issues De Secours
Manoeuvrees Par Une Bequille Ou Une Plaque De Poussee - Prescriptions Et Methodes
D'essai
Schloesser Und Baubeschlaege - Notausgangsverschluesse Mit Druecker Oder Stossplatte -
Anforderungen Und Pruefverfahren
Defines requirements for the manufacturing, performance and testing of emergency devices
mechanically operated either by a lever handle or push pad, to be used where a panic situation is not
likely to happen. Does not define any particular design of emergency device, but only such dimensions
as are necessary for safety reasons. Not applicable to devices for the seriously disabled.

ÖNORM EN 1125
Building hardware - panic exit devices operated by a horizontal bar - requirements and
test methods
Quincaillerie Pour Le Batiment - Fermetures Anti-Panique Pour Issues De Secours
Manoeuvrees Par Une Barre Horizontale - Prescriptions Et Methodes D'essai
Schloesser Und Baubeschlaege - Paniktuerverschluesse Mit Horizontaler
Betaetigungsstange - Anforderungen Und Pruefverfahren
Defines requirements for manufacturing, performance and test of panic devices mechanically operated
by either a horizontal push-bar or touch bar designed especially for panic situation use. It does not
specify any particular design of panic device and only such dimensions as are required for safety
reasons are specified. It does not cover specific devices intended for use by the severely disabled.

ÖNORM V 5603
Motor vehicles for the transport of persons sitting in a wheelchair
Kraftfahrzeuge Zur Befoederung Im Rollstuhl Sitzender Personen

ÖNORM B 1600 - 2005 05 01:N
Building without Barriers - Design Principles

ÖNORM B 1601 - 2003 12 01:N
Special buildings for handicapped or old persons - Design Principles

ÖNORM B 1602 - 2001 06 01N
Barrier free buildings for teaching and training and possible accompanying facilities (+B 1600)

ÖNORM B 1603 - 2005 02 02:N
Barrier free buildings for tourism - Design principles (+B 1600)

ÖNORM B 1602 and ÖNORM B 1603 have to be used together with the basic berrier free building standards ÖNORM B 1600.

ÖNORM A 3012 - 1994 04 01 N
Visual guiding systems for public information - Oroentation supported by directional arrows, graphic symbols, text, light and colour

ÖNORM V 2101 - 2003 09 01:N
Technical aids for visually impaired and blind persons - Acoustical and tactile auxiliary signals for traffic-lights

ÖNORM V 2102-1 2003-06-01:N
Technical aids for visually impaired and blind persons - Tactile ground surface indicators - Part 1: For pavements in buildings and in the public area at speeds not higher than 80km/h

ÖNORM V 2103 - 2003 09 01:N
Technical aids for visually impaired and blind persons - Portable transmitters for the activation of auxilliary equipment for disabled persons

ÖNORM V 2104 - 2000 05 01:N
Technical aids for blind, visually and mobility impaired persons - Safety devices for construction and dangerous sites

ÖNORM V 2105 - 2006 06 01:N-E
Technical aids for visually impaired and blind persons - Tactile inscriptions and information systems

20.3 British/UK Standards

Publisher: BSI, British Standards Institution, 389 Chiswick High Road, London, W4 4AL.

BS 8300 Design of buildings and their approaches to meet the needs of disabled people - code of practice
Provides guidance on the design of domestic and non-domestic buildings and their approaches so that they are convenient and safe to use by disabled people. Although the primary aim of these recommendations is for application to new buildings, they can also be used as guidelines for assessing the accessibility and usability of existing buildings and where practicable, as a basis for their improvement. This standard references many other standards.

The contents include:

1 Scope
2 Normative references
3 Terms and definitions
4 Car parking, setting down points and garaging
5 Access routes to and around buildings
6 Entering a building
7 Horizontal circulation
8 Vertical circulation
9 Surfaces and communication aids
10 Facilities in buildings
11 Assembly areas
12 Individual rooms
13 Building types

Appendices
Annex A (informative) - Development of legislation on
access and facilities for disabled
people
Annex B (informative) - Space allowances for people passing
on an access route
Annex C (informative) - Slip potential characteristics of
tread and floor finishes
Annex D (informative) - Reach ranges
Annex E (informative) - Space allowances
Annex F (informative) - Management and maintenance issues
Annex G (informative) - Using light reflectance values (LRVs)
to assess visual contrast
Bibliography

BS 1945: 1971, Specification for fireguards for heating appliances (gas, electric and oil-burning.

BS 5619: 1978, Code of practice for design of housing for the convenience of disabled people.

BS 5810: 1979, Code of practice for access for the disabled to buildings.

BS 6465-1:2006 Sanitary installations
– Part 1: Code of practice for the design of sanitary facilities and scales of provision of sanitary and associated appliances.
– Part 2: Code of practice for space requirements for sanitary appliances, British
– Part 3: Code of practice for the selection, installation and maintenance of sanitary and associated appliances.

BS 6523(1989)
Information on access to and movement within and around buildings and on certain facilities for disabled people, Committee B/209/8.
Describes access to, movement within and around, buildings by people who are disabled and options for future British Standards dealing the these topics. Although egress from buildings is by definition included, egress in an emergency is not. Does not attempt to define terms such as disabled. Sets out information currently available in existing British and foreign national standards, ISO publications, and national and international publications produced by organizations for disabled people. Gives information on the results of research in different countries.

The contents include:

Section one. General
1.1 Scope
1.2 General
Section two. Analysis
2.1 Status, background and purpose
2.1.1 Status
2.1.2 Background and introduction
2.1.3 Purpose and aim
2.2 Scope and application
2.2.1 General
2.2.2 Types of disablement
2.2.3 Types of buildings
2.3 Graphics convention
2.4 Definitions
2.5 Design information
2.5.1 General information on features, fittings and spaces included
2.5.2 Information relating to specific buildings
2.5.3 Anthropometric information
2.6 Drafting and presentation
2.6.1 Drafting rules
2.6.2 Contents list
2.6.3 Structure
2.6 4 Provision of information
2.6.5 Figures
2.6.6 Appendices
2.6.7 Cross-referencing
2.6.8 Reference to other documents
2.6.9 Bibliographies
2.6.10 Indexes
2.6.11 Number of pages

Section three. Conclusions and recommendations
3.1 Status, background and purpose
3.1.1 Status
3.1.2 Background and introduction
3.1.3 Purpose and aim
3.2 Scope and application
3.2.1 General
3.2.2 Types of disablement
3.2.3 Types of buildings
3.3 Graphics convention
3.4 Definitions
3.5 Design information
3.5.1 General information on features, fittings and spaces
3.5.2 Information relating to specific buildings
3.5.3 Anthropometric information
3.6 Drafting and presentation
3.6.1 Drafting rules
3.6.2 Contents list
3.6.3 Structure
3.6.4 Provision of information
3.6.5 Figures
3.6.6 Appendices
3.6.7 Cross-referencing
3.6.8 Reference to other documents
3.6.9 Bibliographies
3.6.10 Indexes
3.6.11 Number of pages

20.4 Dutch standards

Publisher: NEN, Nederlands Normalisatie-Instituut, Postbus 5059, 2600 Gb, Delft, Netherlands

NEN 1814
Accessibility of environment, buildings and dwellings
Toegankelijkheid Van Gebouwen En Buitenruimten

NEN EN 179
Building hardware - emergency exit devices operated by a lever handle or push pad requirements and test methods
Hang- En Sluitwerk - Sluitingen Voor Nooduitgangen Met Een Deurkruk Of Een Drukplaat - Eisen En Beproevingsmethoden
Defines requirements for the manufacturing, performance and testing of emergency devices mechanically operated either by a lever handle or push pad, to be used where a panic situation is not likely to happen. Does not define any particular design of emergency device, but only such dimensions as are necessary for safety reasons. Not applicable to devices for the seriously disabled.

NEN EN 1125
Building hardware - panic exit devices operated by a horizontal bar - requirements and test methods
Hang- En Sluitwerk - Panieksluitingen Voor Vluchtdeuren Met Een Horizontale Bedieningsstang - Eisen En Beproevingsmethoden
Defines requirements for manufacturing, performance and test of panic devices mechanically operated by either a horizontal push-bar or touch bar designed especially for panic situation use. It does not specify any particular design of panic device and only such dimensions as are required for safety reasons are specified. It does not cover specific devices intended for use by the severely disabled.

NEN EN ISO 16201
Technical aids for disabled persons - requirements and test methods for environmental control systems
Technische Hulpmiddelen Voor Gehandicapten - Eisen En Beproevingsmethoden Voor Omgevingscontrolesystemen
Describes functional and technical requirements and test methods for environmental control systems intended for use to alleviate or compensate for a handicap.

20.5 German Standards

Publisher DIN:Deutsches Institut Fuer Normung E.V., Burggrafenstrasse 6, D-10787 Berlin, Germany

DIN 18024-1 (Partially Superseded)
Barrier-free built environment - Part 1: streets, squares, paths, public transport, recreation areas and playgrounds - design principles
Barrierefreies bauen - strassen, plaetze, wege, oeffentliche verkehrs- und gruenanlagen sowie spielplaetze; planungsgrudnlagen
This standard is included in DIN Handbook 38, 105 and 199. It covers people with handicaps, older humans, children, and small and large humans.
Referenced Standards
DIN 15325 lifts & service lifts; control devices, signals & additional fittings
DIN 18024-2 construction of accessible buildings - part 2: publicly accessible buildings and workplaces, design principles
DIN 18025-1 accessible dwellings; dwellings for wheel chair users, design principles
DIN 18034 playgrounds and outdoor play areas - requirements and information on planning and operation
DIN 32981 special devices for blind and partially sighted persons on traffic signals - requirements
DIN 5035-2 artificial lighting; recommendations for work places indoors and outdoors.

Din 18024-2 (Partially Superseded)
Construction of accessible buildings - Part 2: publicly accessible buildings and workplaces, design principles
Barrierefreies bauen - oeffentlich zugaengige gebaeude und arbeitsstaetten – planungsgrundlagen
This standard is included in DIN Handbook 199. It covers people with handicaps, older humans, children, and small and large humans.
Referenced Standards
DIN 15325 lifts & service lifts; control devices, signals & additional fittings
DIN 18022 domestic kitchens, bathrooms and WCs - design principles
DIN 18025-1 accessible dwellings; dwellings for wheel chair users, design principles
DIN 5035-2 artificial lighting; recommendations for work places indoors and outdoors

DIN 18025-1 (Partially Superseded by DIN EN 81-70)
Accessible dwellings; dwellings for wheel chair users, design principles
Barrierefreie wohnungen; wohnungen fuer rollstuhlbenutzer; planungsgrundlagen
Referenced Standards
DIN 15325 LIFTS & SERVICE LIFTS; CONTROL DEVICES, SIGNALS & ADDITIONAL FITTINGS
DIN 18017-3 VENTILATION OF BATHROOMS AND WCS WITHOUT OUTSIDE WINDOWS BY FANS
DIN 18022 DOMESTIC KITCHENS, BATHROOMS AND WCS - DESIGN PRINCIPLES
DIN 18025-2 ACCESSIBLE DWELLINGS; DESIGN PRINCIPLES
DIN 4701-2 RULES FOR CALCULATING THE HEAT REQUIREMENT OF BUILDINGS; TABLES, PICTURES, ALGORITHMS

DIN 18025-2
Accessible dwellings; design principles
Barrierefreie wohnungen; planungsgrundlagen
Referenced Standards
Din 15306 Lifts - Passenger Lifts In Residential Buildings - Functional Dimensions
Din 15309 Lifts - Passenger Lifts In Non-Residential Buildings And Bed Lifts - Functional Dimensions
Din 15325 Lifts & Service Lifts; Control Devices, Signals & Additional Fittings
Din 18022 Domestic Kitchens, Bathrooms And Wcs - Design Principles
Din 18024-1 Barrier-Free Built Environment - Part 1: Streets, Squares, Paths, Public Transport, Recreation Areas And Playgrounds - Design Principles
Din 18024-2 Construction Of Accessible Buildings - Part 2: Publicly Accessible Buildings And Workplaces, Design Principles
Din 18025-1 Accessible Dwellings; Dwellings For Wheel Chair Users, Design Principles
Din 18064 Stairs; Terms
Din 4701-2 Rules For Calculating The Heat Requirement Of Buildings; Tables, Pictures, Algorithms

DIN 18030
Barrierfree building - design principles
Barrierefreies bauen – planungsgrundlagen

DIN 32977-1
Adapted designing for disabled persons; definitions and general principle
Behinderungsgerechtes gestalten; begriffe und allgemeine leitsaetze

DIN 32984
Ground surface indicators in public traffic areas
Bodenindikatoren im oeffentlichen verkehrsraum

DIN 32985
Ramps installed on vehicles for wheelchair users and for people restricted in their mobility - safety requirements and testing
Fahrzeuggebundene rampen fuer rollstuhlbenutzer und andere mobilitaetsbehinderte personen - sicherheitstechnische anforderungen und pruefung

DIN 66079-4
Graphical symbols for public information - Part 4: Graphical symbols for disabled persons
Graphische symbole zur information der oeffentlichkeit - Teil 4: Graphischen symbole fuer behinderte

DIN 75078-1
Motor vehicle for the transport of persons with reduced mobility - part 1: terms and definitions, requirements, test
Kraftfahrzeuge zur befoerderung von personen mit eingeschraenkter mobilitaet - teil 1: begriffe, anforderungen, pruefung

DIN 75078-2
Motor vehicle for the transportation of handicapped persons - Part 2: Restraint systems - concepts, requirements, testing
Behindertentransportkraftwagen (btw) - Teil 2: Rueckhaltesysteme - begriffe, anforderungen, pruefung

DIN 77800
Quality requirements for providers of "assisted living for the elderly"
Qualitaetsanforderungen an anbieter des wohnmodells "betreutes wohnen fuer aeltere menschen"

DIN EN 179
Building hardware - emergency exit devices operated by a lever handle or push pad - requirements and test methods
Schloesser und baubeschlaege - notausgangsverschluesse mit druecker oder stossplatte - anforderungen und pruefverfahren
This is the official English edition of the DIN document of the same number. The German edition is legally binding and may be a later version.

DIN EN 1725
Domestic furniture - beds and mattresses - safety requirements and test methods
Wohnmoebel - betten und matratzen - sicherheitstechnische anforderungen und pruefverfahren
This is the official English edition of the DIN document of the same number. The German edition is legally binding and may be a later version. The standard is included in DIN Handbook 66. Defines mechanical safety requirements and testing for all kinds Defines mechanical safety requirements and testing for all kinds Defines mechanical safety requirements and testing for all kinds Defines mechanical safety requirements and testing for all kinds of fully erected domestic adult beds, including all component elements eg bed frame, base, mattress and mattress pads(when they form a unit with the mattress). Not applicable to foldaway beds, bunk beds, children's cots and adjustable beds for disabled persons, when separate standards exist, in addition to water beds and air beds.

DIN EN 1756-2
Tail lifts - platform lifts for mounting on wheeled vehicles - safety requirements - part 2: tail lifts for passengers
Hubladebuehnen - plattformlifte fuer die anbringung an radfahrzeugen - sicherheitsanforderungen - teil 2: hubladebuehnen fuer passagiere
This is the official English edition of the DIN document of the same number. The German edition is legally binding and may be a later version.

DIN EN 12182
Technical aids for disabled persons - general requirements and test methods
Technische hilfen fuer behinderte menschen - allgemeine anforderungen und pruefverfahren
This standard is included in DIN Handbook 199 and 257.Gives general test procedures and criteria for technical aids for Gives general test procedures and criteria for technical aids for Gives general test procedures and criteria for technical aids for Gives general test procedures and criteria for technical aids for the disabled, intended to be medical devices by the manufacturer for purposes of the EU Directive 93/42/EEC relating to medical devices. Technical aids for dispensing pharmaceutical substances are not covered.

DIN-FACHBERICHT 131
Guidelines for standards developers to address the needs of older persons and persons with disabilities
Leitlinien fuer normungsgremien zur beruecksichtigung der beduerfnisse von aelteren menschen und von menschen mit behinderungen

DIN V 32977 (superseded)
Adapted designing for disabled persons; definitions and general principles
Behinderungsgerechtes gestabten; begriffe unde allgemeine leitsaetze
Publisher VDI:Verein Deutscher Ingenieure
Postfach 10 11 39, D-40002 Duesseldorf, Germany
Barrier Free Buildings For Living - Standards For Electrical Installations And Lifts
Barrierefreie Und Behindertengerechte Lebensraeume - Anforderungen An Die Elektro- Und Foerdertechnik
Provides requirements and solution routes in and on buildings for elderly or sick or disabled persons, independently from their respective social concept of care in respect of - Control and signalling equipment - Electrical engineering - Communication engineering - Safety engineering - Lighting engineering - Conveyor technology and the best combination of the above in any situation. The electrical components also cover the components of the remaining technical building services (heating, ventilation etc.) and facilities.

20.6 European Standards

Publisher: ETSI, European Telecommunications Standards. Inst., Bp 152, 06921, Sophia Antipolis Cedex, France

EG 202 116
Human Factors (HF); Guidelines for ICT products and services; "Design for all"
Provides guidance to Information and Communication Technology (ICT) product and service designers on Human Factors issues, good Human Factors design practice, and relevant international and national standards. In particular, it aims to help designers to maximize the level of usability of products and services by providing a comprehensive set of Human Factors design guidelines.

EN 301 462
Human Factors (HF); Symbols to identify telecommunications facilities for the deaf and hard of hearing people
Defines a set of symbols identifying telecommunication facilities for deaf and hard of hearing people. The symbols specified in this standard will be applicable to all telecommunication equipment, related signage and publications, that provide or reference the defined facilities and assistive technologies which are intended to support telecommunications by deaf and hard of hearing people.

ETR 166
Human Factors (HF); Evaluation Of Telephones For People With Special Needs; An Evaluation Method
Specifies a method for evaluating the usability of conventional telephones for connection to the Public Switched Telephone Network (PSTN) for groups of people with various disabilities.

TR 102 133
Human factors (HF); access to ICT by young people: issues and guidelines
Evaluates the human interaction issues for access to ict (information and communications
Technology) by children and provides guidance on how these should be dealt with by ETSI. This will also include the ethical and legal issues of security for vulnerable children accessing public communications spaces sections: 7.3 Health and safety concerns and 7.4 Security and privacy concerns

20.7 French standards

Publisher AFNOR: Assoc. Francaise de Normalisation, 11 Avenue Francis De Pressense, 93571 St Denis La Plaine Cedex, France

NF EN 81-70
Safety rules for the construction and installation of lifts - particular applications for passenger and good passenger lifts - part 70: accessibility to lifts for persons including persons with disability
Regles de Securite Pour La Construction et L'installation Des Elevateurs - Applications Particulieres pour Ascenseurs Et Ascenseurs de Charge - Partie 70: Accessibilite Aux Ascenseurs Pour Toutes Les Personnes Y Compris Les Personnes Avec Handicap
Provides the minimum requirements for the safe and independent access and use of lifts by persons, including persons with the disabilities.

NF EN 179
Building hardware - emergency exit devices operated by a lever handle or push pad - requirements and test methods
Quincaillerie Pour Le Batiment - Fermetures D'urgence Pour Issues De Secours Manoeuvrees Par Une Bequille Ou Une Plaque De Poussee - Prescriptions Et Methodes D'essai
Defines requirements for the manufacturing, performance and testing of emergency devices mechanically operated either by a lever handle or push pad, to be used where a panic situation is not likely to happen. Does not define any particular design of emergency device, but only such dimensions as are necessary for safety reasons. Not applicable to devices for the seriously disabled.

NF ISO/IEC GUIDE 71
Guidelines for standards developers to address the needs of older persons and persons with disabilities
Principes Directeurs Pour Les Normalisateurs Afin De Repondre Aux Besoins Des Personnes Agees Et De Celles Ayant Des Incapacites

NFP 82 222
Vertical elevators for persons with impaired mobility - safety rules for construction and installation
Ascenseurs Et Monte-Charge - Appareils Elevateurs Verticaux Pour Personnes A Mobilite Reduite - Regles De Securite Pour La Construction Et Pour L'installation

NFP 82 244
Lifts and service lifts - vertical elevators for persons with impaired mobility - application guide for the French standard NFP 82-222 for appliance with the essential requirements of European Directive 89/392/EEC ("machinery" directive) and its amendments 93/44/EEC and 93/68/EEC
Ascenseurs Et Monte-Charge - Appareils Elevateurs Verticaux Pour Personnes A Mobilite Reduite - Guide D'application De La Norme Francaise Nf P 82-222 Pour Satisfaire Aux Exigences Essentielles De La Directive Europeenne 89/392/Cee (Directive "Machine") Et Ses Amendements 93/44/Cee Et 93/68/Cee

NFP 91 201
Building construction for physically handicapped persons
Construction - Handicapes Physiques

NFP 91 202
Accessibility to public transport for the physically handicapped people
Handicapes Physiques - Approche Et Acces Aux Moyens De Transports Collectifs

NFP 93 521
Building site equipment - ladder (steps) or stairway type building site access towers - materials - dimensions - calculation loads - resistance and safety requirements - tests
Equipement De Chantier - Tours D'acces De Chantier A Echelles A Marche Ou Escaliers - Materiaux - Dimensions - Charges De Calcul - Exigences De Resistance Et De Securite - Essais

NFP 93 522
Building site equipment - building site stairways intended for access and evacuation of personnel - materials - dimensions - calculation loads - resistance and safety requirement - tests
Equipement De Chantier - Escaliers De Chantier Destines A L'acces Et A L'evacuation Du Personnel - Materiaux - Dimensions - Charges De Calcul - Exigences De Resistance Et De Securite – Essais

NFP 98 350
Ways - insertion of disabled persons - urban pedestrian ways - design and equipping conditions for ways
Cheminement - Insertion Des Handicapes - Cheminement Pietonnier Urbain - Conditions De Conception Et D'amenagement Des Cheminements Pour L'insertion Des Personnes Handicapes

NFP 98 351
Footways - provision for disabled persons - warning for caution - characteristics and testing of pedotactile warning devices for the blind or partially sighted
Cheminements - Insertion Des Handicapes - Eveil De Vigilance - Caracteristiques Et Essais Des Dispositifs Podo-Tactiles Au Sol D'eveil De Vigilance A L'usage Des Personnes Aveugles Ou Mal Voyantes

NFR 18 802
Road vehicles - vehicles for transporting handicapped people, with a maximum capacity of a passenger including the driver - characteristics
Vehicules Pour Le Transport De Personnes Handicapees D'une Capacite Maximale De 9 Places, Conducteur Compris - Caracteristiques

NFR 18 804-1
Road vehicles - minimal safety specifications of vehicles for transporting at least one handicapped people - part 1: adaptation of a vehicle for transporting one handicapped person in his wheelchair
Vehicules Routiers - Conditions Minimales De Securite Des Vehicules Destines Au Transport D'au Moins Une Personne Handicapee - Partie 1: Amenagement D'un Vehicule Permettant Le Transport D'une Personne Dans Son Fauteuil Roulant

NFR 18 805
Road vehicles - access of at least one reduced mobility passenger to taxi
Vehicules Routiers - Accessibilite Des Taxis Pour Au Moins Un Passager A Mobilite Reduite

NFX 35 500
Working place - integration of disabled persons - workshop working places requirements for the design of working places on cutting machines for the integration of disabled persons
Insertion Des Handicapes - Postes De Travail En Atelier - Conditions D'amenagement Des Postes Sur Machines Travaillant Par Enlevement De Matiere Pour L'insertion Des Personnes Handicapees

20.8 International standards

Publisher: ISO International Org. For Standardization, Cast Postale 56, Ch-1211 Geneve 20, Switzerland

ISO/IEC GUIDE 71
Guidelines for standards developers to address the needs of older persons and persons with disabilities
Gives guidance to writers of relevant International Standards on how to take into account the needs of older persons and persons with disabilities. This guide intends to: - to inform, increase understanding and raise awareness about how human abilities impact on the usability of products, services and environments, - to outline the relationship between the requirements in standards and the accessibility and usability of products and services, and - to raise awareness about the benefits of adopting accessible design principles in terms of a wider market.

ISO TR 9527
Building construction - needs of disabled people in buildings - design guidelines
Concerns with the problems of the handicapped in buildings, as far as they present practical challenges to designers and architects. Provides some guidance for planners and for the formulation of local regulation, standards, recommendations etc. not in the form of a standard but in the form of a general account of basic and particular needs.

Publisher UIC:Union Internationale Des Chemins De Fer, 16 Rue Jean Rey, 75015 Paris, France http://www.uic.asso.fr/

UIC 565-3
Indications for the layout of coaches suitable for conveying disabled passengers in their wheelchairs
Indications Relatives A L'amenagement Des Voitures Aptes Egalement Au Transport Des Handicapes Dans Leurs Fauteuils Roulants
Hinweise Fuer Die Ausstattung Von Reisezugwagen, In Denen Auch Behinderte Mit Ihren Rollstuehlen Befoerdert Werden Koennen
Contains basic indications for the design and layout of coaches specially adapted for the conveyance of disabled passengers in their wheelchairs. Depending on requirements, all or part of the leaflet may be taken into account in the design of such coaches.

20.9 Irish Standards

Publisher: NSAI: National Standards Authority Of Ireland, Glasnevin, Dublin 9, Ireland

I.S. EN 179
Building hardware - emergency exit devices operated by a lever handle or push pad - requirements and test methods
Defines requirements for the manufacturing, performance and testing of emergency devices mechanically operated either by a lever handle or push pad, to be used where a panic situation is not likely to happen. Does not define any particular design of emergency device, but only such dimensions as are necessary for safety reasons. Not applicable to devices for the seriously disabled.

I.S. ETR 166
Human factors (hf) - evaluation of telephones for people with special needs - an evaluation method
Provides a checklist for the assessment of simple telephone terminals under regard of the special needs of disabled people.

20.10 Italian standards

Publisher UNI:Ente Nazionale Italiano Di Unificazione, Via Sannio, 2, 20135 Milano, Italy, Uni 9801

UNI EN 1125
Building hardware - panic exit devices operated by a horizontal bar - requirements and test methods
Accessori Per Serramenti - Dispositivi Antipanico Per Uscite Di Sicurezza Azionati Mediante Una Barra Orizzontale - Requisiti E Metodi Di Prova
Defines requirements for manufacturing, performance and test of panic devices mechanically operated by either a horizontal push-bar or touch bar designed especially for panic situation use. It does not specify any particular design of panic device and only such dimensions as are required for safety reasons are specified. It does not cover specific devices intended for use by the severely disabled.

20.11 Japanese standards

Publisher: JIS, Japanese Standards Association, 1-24 Akasaka 4-Chome, Minato-Ku, Tokyo 107, Japan

JIS Z8071
Guidelines for standards developers to address the needs of older persons and persons with disabilities
Gives guidance to writers of relevant Standards on how to take into account the needs of older persons and persons with disabilities. Applicable to products, services and environments encountered in all aspects of daily life and intended for the consumer market and the workplace. References to other standards includes: ISO/IEC GUIDE 50 SAFETY ASPECTS - GUIDELINES FOR CHILD SAFETY.

20.12 Norwegian Standards

Publisher: NS, Pronorm, Strandveien 18, 1326 Lysaker, Norway.

NS EN 179
Building hardware - emergency exit devices operated by a lever handle or push pad - requirements and test methods
Quincaillerie Pour Le Batiment - Fermetures D'urgence Pour Issues De Secours Manoeuvrees Par Une Bequille Ou Une Plaque De Poussee - Prescriptions Et Methodes D'essai
Defines requirements for the manufacturing, performance and testing of emergency devices mechanically operated either by a lever handle or push pad, to be used where a panic situation is not likely to happen. Does not define any particular design of emergency device, but only such dimensions as are necessary for safety reasons. Not applicable to devices for the seriously disabled.

20.13 Russian Standards

Published by: Gost:Interstandard, Leninsky Prospect, 9,117049, Moscow, A-49, Ani-1, Russia

GOST R 50844
Buses for carrying invalids - General requirements

GOST R 51090
Designated public transportation vehicle - general requirements of accessibility and safety for individuals with disabilities

GOST R 51261
Support stationary devices for disabled persons - types and technical requirements

GOST R 51630
Inclined and vertical lifting platforms for persons with physical disabilities - technical requirements of accessibility

GOST R 51633
Devices and adapters, which are used to rehabilitation of individuals with disabilities at home - general technical requirements

GOST R 51645
Working place for disabled to sight to type special computer - technical requirements to equipment and to productive environment

GOST R 51671
Technical aids for communication and information of public use for disabled persons - classification - requirements of accessibility and safety

GOST R 51764
Rehabilitation transportation boarding devices for disabled persons - general technical requirements

20.14 Spanish standards

Publisher AENOR: Asociacion Espanola De Normalizacion, Certificacion, Fernandez De La Hoz, 52, 28010 Madrid, Espana

UNE 26450
Road Vehicles - Fitting Of Motor Vehicles To Be Used By A Handicapped Driver - Technical Specifications
Vehiculos De Carretera - Acondicionamiento De Los Vehiculos Automoviles Utilizados Por Un Conductor Discapacitado Fisicamente - Especificaciones Tecnicas
Committee Ctn 41

UNE 41500
Accessibility in building and urbanism - design general criteria
Accesibilidad En La Edificacion Y El Urbanismo - Criterios Generales De Diseno
Committee Ctn 41

UNE 41501
Symbol of accessibility for mobility - rules and grades of use
Simbolo De Accesibilidad Para La Movilidad - Reglas Y Grados De Uso
Committee CTN 41
Relates to public information symbols

UNE 41510
Accessibility in the urban environment
Accesibilidad En El Urbanismo
Committee CTN 41

UNE 41512
Accessibility in beaches and in its environs
Accesibilidad En Las Playas Y En Su Entorno
Committee CTN 41
Draws upon other standards related to aids for disabled and handicapped people and to physical planning and town planning

UNE 41513
Accessible urban itineraries in case of urban works
Itinerarios Urbanos Accesibles En Casos De Obras En La Calle
Committee CTN 41

UNE 41520
Accessibility in building - horizontal communication elements
Accesibilidad En La Edificacion - Espacios De Comunicacion Horizontal
Committee CTN 41

UNE 41522
Accessibility in building - accesses to the buildings
Accesibilidad En La Edificacion - Accesos A Los Edificios
Committee Ctn 41

UNE 170001-1
Global accessibility - criteria to facilitate accessibility to the environment - part 1: dalco requirements
Accesibilidad Global - Criterios Para Facilitar La Accesibilidad Al Entorno - Parte 1:
Requisitos Dalco

UNE 170001-2
Global accessibility - criteria to facilitate accessibility to the environment - part 2: global accessibility management system
Accesibilidad Global - Criterios Para Facilitar La Accesibilidad Al Entorno - Parte 2: Sistema
De Gestion De La Accesibilidad Global
Committee CTN 170

UNE 170006
Guidelines for standards developers to address the needs of older persons and persons with disabilities
Directrices Para Que El Desarrollo De Las Normas Tenga En Cuenta Las Necesidades De
Las Personas Mayores Y Las Personas Con Discapacidad

UNE EN 179
Building hardware - emergency exit devices operated by a level handle or push pad - requirements and test methods
Herrajes Para La Edificacion - Dispositivos De Emergencia Accionadas Por Una Manilla O Un Pulsador
Para Salidas De Socorro - Requisitos Y Metodos De Ensayo
Defines requirements for the manufacturing, performance and testing of emergency devices mechanically operated either by a lever handle or push pad, to be used where a panic situation is not likely to happen. Does not define any particular design of emergency device, but only such dimensions as are necessary for safety reasons. Not applicable to devices for the seriously disabled.

UNE EN 1125
Building hardware - panic exit devices operated by a horizontal bar - requirements and test methods
Herrajes Para La Edificacion - Dispositivos Antipanico Para Salidas De Emergencia
Activados Por Una Barra Horizontal - Requisitos Y Metodos De Ensayo
Defines requirements for manufacturing, performance and test of panic devices mechanically operated by either a horizontal push-bar or touch bar designed especially for panic situation use. It does not specify any particular design of panic device and only such dimensions as are required for safety reasons are specified. It does not cover specific devices intended for use by the severely disabled.

20.15 Swiss standards

SNV: Swiss Association For Standardization, Buerglistr. 29, 8400 Winterthur, Switzerland

SN EN 179

Building hardware - emergency exit devices operated by a lever handle or push pad - requirements and test methods

French: Quincaillerie Pour Le Batiment - Fermetures D'urgence Pour Issues De Secours Manoeuvrees Par Une Bequille Ou Une Plaque De Poussee - Prescriptions Et Methodes D'essai

German: Schloesser Und Baubeschlaege - Notausgangsverschluesse Mit Druecker Oder.

Romansch: Stossplatte, Fuer Turen In Rettungswegen - Anforderungen Und Pruefverfahren

Defines requirements for the manufacturing, performance and testing of emergency devices mechanically operated either by a lever handle or push pad, to be used where a panic situation is not likely to happen. Does not define any particular design of emergency device, but only such dimensions as are necessary for safety reasons. Not applicable to devices for the seriously disabled.

SN EN 1125

Building hardware - panic exit devices operated by a horizontal bar - requirements and test methods

Quincaillerie Pour Le Batiment - Fermetures Anti-Panique Pour Issues De Secours Manoeuvrees Par Une Barre Horizontale - Prescriptions Et Methodes D'essai

Schloesser Und Baubeschalaege - Paniktuerverschluesse Mit Horizontaler Betaetigungsstange Fuer Tueren In Rettungswegen - Anforderungen Und Pruefverfahren

Defines requirements for manufacturing, performance and test of panic devices mechanically operated by either a horizontal push-bar or touch bar designed especially for panic situation use. It does not specify any particular design of panic device and only such dimensions as are required for safety reasons are specified. It does not cover specific devices intended for use by the severely disabled.

SS EN 1125

Building hardware - panic exit devices operated by a horizontal bar - requirements and test methods

Quincaillerie Pour Le Batiment - Fermetures Anti-Panique Pour Issues De Secours Manoeuvrees Par Une Barre Horizontale - Prescriptions Et Methodes D'essai

Schloesser Und Baubeschlaege - Paniktuerverschluesse Mit Horizontaler Betaetigungsstange - Anforderungen Und Pruefverfahren

Byggnadsbeslag - Panikutrymningsbeslag Manovrerade Med Horisontell Tryckstang - Krav Och Provning

Summary Defines requirements for manufacturing, performance and test of panic devices mechanically operated by either a horizontal push-bar or touch bar designed especially for panic situation use. It does not specify any particular design of panic device and only such dimensions as are required for safety reasons are specified. It does not cover specific devices intended for use by the severely disabled.

21 Appendix 3: Links to relevant organisations and resources in Europe

The following section provides links to relevant national and international organisations and resources. To highlight this, an image of the appropriate flag is presented below each section heading.

21.1 Belgium

Portal to national ministries concerned with children and disabilities:

http://www.belgium.be/eportal/application?origin=navigationBanner.jsp&event=bea.portal.framework.internal.refresh&pageid=indexPage&navId=5906

21.2 Czech Republic

Conference held in former Czechoslovakia on designing for independent living: http://www.independentliving.org/cib/cibprague1.html

21.3 Denmark

Accessibility of educational institutions in Denmark: http://tilgaengelighed.emu.dk/tilgaengelighed/English/fysisktg/index.html

21.4 Finland

Finnish presidency of the EU covering discussions of social, welfare and educational matters. http://www.finland.eu/en/

21.5 Germany

Bundesministerium für Familie, Senioren, Frauen und Jugend: Ministry for the family, older people, women and young people.http://www.bmfsfj.de/

21.6 Greece

Search engine leading to technical guidelines from Greece (in English): http://opac.tee.gr/

Υπουργός Μεταφορών και Επικοινωνιών: Hellenic Ministry of Transport and Communications. http://www.yme.gr

21.7 Ireland

Citizen's information:

http://www.citizensinformation.ie/create_feedback?type_feedback=question

Department of Health and Children: http://www.dohc.ie/,
National Children's Advisory Council http://www.dohc.ie/working_groups/ncac/, and
Minister's office: Minister's_Office@health.irlgov.ie

Department of Social and Family Affairs: Provides information on welfare
including children in Ireland**.** http://www.welfare.ie/contact/index.html

Department of the Environment, Heritage and Local Government:
http://www.environ.ie/doei/doeihome.nsf?Open

Health and safety executive: http://www.hse.ie/en/ContactUs/

National Children's Advisory Council, Dublin: Council's role involves researching
and producing various pieces of advice, which are then formally submitted to the
Minister for Children. http://www.ncac.ie/contact_us/

National Disability Authority, Údarás Náisúnta Michumais: The National
Disability Authority, on behalf of the State, promotes and helps secure the rights of
people with disabilities. Its responsibilities include policy development, research and
advice on standards. http://www.nda.ie/

21.8 Latvia

Ministry of children and family affairs: Its brief includes the protection of
children's rights. http://www.bm.gov.lv/eng/protection_of_childrens_rights/

21.9 Slovakia

**Children's Fund of the Slovak Republic or Detsky Fond Slovenskej
Republiky (DFSR):** The objective of DFSR is to promote child rights
through assistance in creating suitable (ideational/conceptual/material) conditions for
the material, social and psychological well-being of children in the Slovak Republic.
Main activities include: providing help to handicapped children, helping form alliances
between the handicapped and the non-handicapped, counselling for young people in
stress or crisis situations, social work with children under threat, campaigns; for
example against corporal punishment to children, publications, co-operation with
media. www.dfsr.sk

Ministerstvo životného prosredia, Slovenskej republiky: Ministry of Environment
of the Slovak Republic. Guideline No.192/1994 has been issues by the Ministry on
general requirements for building construction being used by disabled people.
http://www.enviro.gov.sk/servlets/page/166

21.10 Sweden

All sites listed below have information both in Swedish and English. Several provide information in an adapted form, e.g. in sign language.

Boverket: The National Board of Housing, Building and Planning. Its areas of work include accessibility in built environments and the adaptation of housing. www.boverket.se

Forsakringskassan: The Swedish Social Insurance Administration (grants, etc, summarised information on social insurance in nine languages) www.forsakringskassan.se/sprak/index.php

Handikappombudsmannen: The Swedish Disability Ombudsman which monitors disabled people's rights www.ho.se.

Handisam: Swedish agency for disability policy coordination set up in 2006 www.handisam.se

Hjälpmedelsinstitutet: The Swedish Handicap Institute – a national knowledge centre working with assistive technology and accessibility. www.hi.se

HSO: The Swedish Disability Federation an umbrella organisation www.hso.se

Lattlast: The Centre for Easy-to-Read. This is a network for easy-to-read books, newspapers and journals, readers' assistants. www.lattlast.se

Rikstrafiken: The National Public Transport Agency which works with accessible travel, etc. www.rikstrafiken.se

SISUS: The National Agency for Special Educational Support. Its activities are divided up to become part of Handisam and the National Board of Health and Welfare in 2006 www.sisus.se

SIT: The Swedish Institute for Special Needs Education (responsible for state support in this field) www.sit.se

Socialstyrelsen: The National Board of Health and Welfare. Site includes a useful search engine to locate documents. www.socialstyrelsen.se

Skolverket: The Swedish National Agency for Education (responsible for educational matters) www.skolverket.se

Sosmeyne: The National Board of Health and Welfare (national expert and supervisory authority for various policy areas, including disability, and the sectoral agency for the national action plan, reports, statistics, diagnostic information) www.sos.se/sosmenye.htm

Sverigeturism: Portal for information for people with disabilities to Sweden http://www.sverigeturism.se/smorgasbord/smorgasbord/service/disabled.html

TPB: The Swedish Library of Talking Books and Braille which supplies the country's libraries and others with accessible literature www.tpb.se

Vägverket: The Swedish Road Administration covering public planning of transport systems, road safety, etc. www.vv.se

21.11 United Kingdom

British Standards search facility:
http://www.tradeprintsupplies.co.uk/shop/products_view.php?prod=65623.

British Standards search facility:
http://www.tradeprintsupplies.co.uk/shop/products_view.php?prod=65623

Child Rights Information Network: The Child Rights Information Network (CRIN) is a global network that disseminates information about the Convention on the Rights of the Child and child rights amongst non-governmental organisations (NGOs), United Nations agencies, inter-governmental organisation (IGOs), educational institutions, and other child rights experts. The Coordinating Unit is based in London, UK. http://www.crin.org/ Example relevant reports are at: http://www.crin.org/resources/infoDetail.asp?ID=11797 and http://www.crin.org/resources/infodetail.asp?id=10710

Contact a family: Support group for families with disabled children. http://www.cafamily.org.uk/

Department for Education and Skills (DfES): The Department for Education and Skills was established with the purpose of creating opportunity, releasing potential and achieving excellence for all. http://www.dfes.gov.uk/. The DfES has published a new resource on implementing the Disability Discrimination Act in schools and early years settings: www.teachernet.gov.uk/wholeschool/sen/. The DfES and Skills Early Support Team has also published the "Informed Choice, Families and Deaf Children" handbook for professionals, written by the National Deaf Children's Society (NDCS), based on research carried out with the University of Manchester in collaboration with service providers and families: http://www.ndcs.org.uk/news_media/ndcs_press_releases/index.html. The SEN National Adviser Team has produced a report providing an overview and case studies of emerging good practice in services for children with special educational needs and disabilities (removing barriers to achievement): http://www.teachernet.gov.uk/wholeschool/sen/senstrategy/Local_Authority_Illustrative_Case_Studies_2005/ To register for the Department for Education and Skills regular "SEN Update", go to: www.teachernet.gov.uk/wholeschool/sen/updates

Department for Transport (DfT): The Department for Transport is responsible for transport issues (except when devolved), in particular railway franchising and a range of executive agencies. www.dft.gov.uk

Disability Rights Commission (DRC): The DRC is an independent body established to stop discrimination and promote equality of opportunity for disabled people. http://www.drc-gb.org/

Disabled Persons Transport Advisory Committee (DPTAC): We advise the UK Government on access for disabled people to transport. www.dptac.gov.uk A DPTAC resource is a travel guide for disabled people: http://www.dptac.gov.uk/door-to-door.

Design for All Education and Training (EDeAN): Design for All is about ensuring that environments, products, services and interfaces work for people of all ages and abilities. Many professionals and students are interested in this, but there has been no easy source of information, methods, tools and examples to help them achieve it. This website aims to plug that gap by bringing together new and existing information and making it accessible via a single user-friendly interface. www.education.edean.org

Education & Resources for Improving Childhood Continence: Advice and resources on managing childhood continence (http://www.eric.org.uk). Similar information is available from the Government's Sure Start web site: http://www.surestart.gov.uk/surestartservices/inclusionandwellbeing/sendisability/inclusion/)

Enabling Education Network (EENET): This network was initiated by Save the Children UK, in partnership with UK and international non-governmental organisations, and research institutions. EENET provides access to a unique and broad-based body of expertise and experience in the practice of inclusive education world wide. It is committed to prioritising the needs of countries, organisations and individuals who have limited access to basic information and resources. It recognises that education is much broader than schooling. EENET is contributing to the development of inclusive and sustainable education policy and practice by sharing relevant information and experience. A section on Disabled Children's Rights can be found at: http://www.eenet.org.uk/newsletters/news6/page8.shtml

Ergonomics Society: A charitable organisation providing support for ergonomists and to spread knowledge about ergonomics to the wider community. www.ergonomics.org.uk

Ergonomics4schools: Website set up by the UK Ergonomics Society to encourage learning about ergonomics among secondary school students and their teachers. Contains basic ergonomics data that could be adapted for children with disabilities. http://www.ergonomics4schools.com

Every Child Matters: Government initiative to improve the outcomes for all children and young people, including disabled children. http://www.everychildmatters.gov.uk/socialcare/disabledchildren/

Government's Transformation Fund: Fund for improving the qualifications of the early years workforce prioritises training for those working with disabled children: http://www.everychildmatters.gov.uk/earlyyearsworkforce/

Holiday care: A holiday and travel information service for disabled and older people http://www.holidaycare.org.uk/

Joseph Rowntree Foundation: A major social policy research and development charity, which funds a research and development programme to better understand the causes of social difficulties and explore ways of overcoming them. www.jrf.org.uk.

Local Government Ombudsmen: Have published a leaflet for advisers who work with children and young people to help them know when they might refer a complaint to the Ombudsmen and a casebook giving examples of cases where the Ombudsmen have been able to get redress for young people who suffered injustice from councils. http://www.lgo.org.uk/news/info.php?refnum=46&startnum

National Deaf Children's Society (NDCS): This group has published a free information booklet for parents of deaf children, "Vision care for your deaf child": http://www.ndcs.org.uk/news_media/ndcs_press_releases/index.html

National Playing Fields Association (NPFA): Founded in 1925 and granted a Royal Charter in 1933, the NFPA has the specific responsibility for ensuring that everyone has play, sport and recreation space close to where they live.http://www.playing-fields.com/

National Society for the Prevention of Cruelty to Children: Aims to protect children from cruelty, support vulnerable families, campaign for changes to the law and raise awareness about abuse. http://www.nspcc.org.uk.

Nottingham University: Portal on disabled people, planning & housing http://www.nottingham.ac.uk/sbe/planbiblios/bibs/local/LP05c.html

Reasonable Adjustments Project (RAP): The Disability Equality in Education (DEE) have been commissioned by the Department for Education and Skills (DfES) and the Disability Rights Commission to produce a practical guide for teachers, which will help schools to make reasonable adjustments for their disabled pupils and prospective pupils (as detailed in Part IV of the Disability Discrimination Act 1995). http://www.teachernet.gov.uk/wholeschool/sen/schools/accessibility/rap/

Ricability (Research Institute for Consumer Affairs): A national research charity dedicated to providing independent information in the form of consumer reports of value to disabled and older consumers. http://www.ricability.org.uk/reports.htm

Royal Society for the Prevention of Accidents (ROSPA): A registered charity which is actively involved in the promotion of safety and the prevention of accidents in all areas of life - at work, in the home, and on the roads, in schools, at leisure and on (or near) water. http://www.rospa.com/

Royal Society for the Mentally Handicapped Children and Adults (MENCAP): A UK charity which campaigns for equal rights for children and adults with a learning disability and offers a variety of services to them, their families and carers. www.mencap.org.uk

Scope: A UK disability organisation in England and Wales whose focus is people with cerebral palsy. Its aim is for disabled people achieve equality in a society in which they are as valued and have the same human and civil rights as everyone else. (One in 400 children born in the UK has cerebral palsy.) www.scope.org.uk

Sport England: Lottery funded organisation which aims to promote sport within England. Has produced a guide: Access for disabled people, 2002, ISBN 1 86078 149 7, available at: http://www.sportengland.org/disabled.pdf

SureStart: This is a Government programme which aims to achieve better outcomes for children, parents and communities. The website provides information on inclusion and help for families with disabled children. http://www.surestart.gov.uk/. A good practice guide shows how children's centres should be working towards a clear vision aimed at improving children's outcomes with a greater emphasis on outreach and home visiting. This guidance document contains section on working with disabled children, see http://www.surestart.gov.uk/publications/?Document=1500

Teachernet: Government sites on special needs education providing information to teachers. http://www.teachernet.gov.uk. A section of the website concerned with special educational needs and disability is at
http://www.teachernet.gov.uk/wholeschool/sen
with further information at:
http://www.teachernet.gov.uk/wholeschool/sen/schools/accessibility.
Case studies in inclusive education are described in
http://www.teachernet.gov.uk/wholeschool/sen/senstrategy/Local_Authority_Illustrative_Case_Studies_2005.

Training and Development Agency for Schools (TDA): The TDA works with schools to develop the workforce and ensure that schools can recruit good-quality, well-trained people and support schools to provide extended services for parents, children and young people. They have launched a new electronic network for SEN and disability tutors, and others involved in SEN and disability training for teachers. This can be joined by emailing sent@tda.gov.uk

Whizz-Kidz: A national children's charity that provides customised mobility equipment to disabled children and young people. http://www.whizz-kidz.org.uk

21.12 United Nations/European Union

Convention on the Rights of the Child: http://www.unicef.org/crc/

Employment, Social Policy, Health and Consumer Affairs Council (EPSCO): The EPSCO group is composed of employment, social protection, consumer protection, health and equal opportunities ministers, who meet around four times a year.
http://www.consilium.europa.eu/cms3_fo/showPage.asp?id=411&lang=en&mode=g.
Documents produced from Employment, Social Policy, Health and Consumer Affairs can be searched for at:
http://www.consilium.europa.eu/cms3_applications/applications/newsRoom/loadBook.asp?BID=79&LANG=1&cmsid=351

European Disability Forum (EDF): EDF is a European umbrella organisation representing more than 50 million disabled people in Europe. Its mission is to ensure disabled citizens have full access to fundamental and human rights through their active involvement in policy development and implementation in the European Union.
www.edf-feph.org

European Union Disability Strategy: A society open and accessible to all is the goal of the European Union Disability Strategy. The barriers need to be identified and removed. This approach has been stimulated by the United Nations Standard Rules on Equalization of Opportunities for Persons with Disabilities
http://ec.europa.eu/employment_social/disability/strategy_en.html

European Commission portal: http://ec.europa.eu/

European Commission portal on disability issues:
http://ec.europa.eu/employment_social/disability/contact_en.html

Head of Unit: Wallis Goelen, European Commission, DG Employment and Social Affairs, Unit of Integration of People with Disabilities, Rue Joseph II, 27, 2-21, B-1049 Brussels, Belgium. Tel: + 32 - (0)2 - 295 18 27, Email: empl-pwd-info@ec.europa.eu

EC high level group on disability:
http://ec.europa.eu/employment_social/index_en.html

European Academy of Childhood Disability: The EACD is an academic association of professionals working with children with disability throughout Europe. At present its 500 members include paediatricians, neuropaediatricians, physiotherapists, occupational therapists, speech therapists, psychologists, nurses, social workers and special-needs teachers. The group aims to ensure the development of high quality research and teaching in the field of childhood disability; improve the care these children receive; to raise professional standards throughout Europe. http://www.eacd.org/national_coordinators.php

Finland's EU presidency: The website was launched on 31 May 2006, as the Finnish Presidency's main communication channel. The home page gave visitors information on all the most important meetings. www.eu2006.fi The Presidency ended on 31 December 2006, when the baton was passed on to Germany. The address of the German Presidency's website is www.eu2007.de

High level group on disability: As proposed by the Commission in its Communication (COM(96) 406 final), the High Level Group is set up to monitor the latest policies and priorities of Governments concerning people with disabilities, to pool information and experience, and to advise the Commission on methods for reporting in future on the EU-wide situation with regard to disability. http://ec.europa.eu/employment_social/soc-prot/disable/hlg_en.htm

International Institute for Educational Planning: Aims to strengthen the capacity of countries to plan and manage their education systems. Trains planners and managers in skills to analyze and plan, manage and implement, monitor and evaluate. Supporting institutions and improving administrative routines, organization, leadership skills. Fostering an enabling environment through policy forums, international co-operation and networking. www.unesco.org/iiep

POLIS Project - Decision Support Tools and Policy Initiatives in Support of Universal Design in Buildings: POLIS is a EU research project, co-funded by the 6th framework for R&D and running in the three-year period from 2003 till end of 200. Its objectives are: (1) To provide for a detailed analysis of the economics, i.e., costs and benefits associated with accessibility and to use this information to develop a decision support system. It is estimated for instance inaccessible infrastructures reduces the income that could be generated by tourism by 15- 20% of the global market. (2) To review EU and member states' policy instruments and suggest practical means of integration within existing or, very likely, newly required policy instruments, towards the ultimate goal of an "accessibility for all" EU standard. (3) To disseminate the results to diverse audiences and to identify business opportunities in terms of new-era assistive technologies and services. http://www.designfor21st.org/proceedings/proceedings/project_sakkas.html and http://www.polis-ubd.net/?cat=general_information

Reasonable access project: This project funded as a European Commission Framework 6 Special Support Action ran from January 2005 to June 2006 and involved the Universities of Leeds and Malta. The objectives were: (1) to standardised technical expression of the term 'reasonable accessibility and

accommodation' to the physical built environment for people with a disability, (2) to determine and elaborate the policy implications of the technical expression of 'reasonable accessibility and accommodation', (3) to develop Good Practice Guidance for defining and implementing reasonable accessibility and accommodation in design, (4) to develop an exemplar Business Case the standardised technical expression of the term 'reasonable accessibility and accommodation' to the physical built environment people with a disability.
http://www.reasonableaccess.info/about.asp

21.13 United States of America

International Ergonomics Association: Have produced a website 'Ergonomics for Children and Educational Environments' covering ergonomics for children in education. Includes for example height of keyboard and mouse, seating position showing examples of both good and bad postures, positioning of wrist and monitor position. Students should not have to bend neck. Recommends changing position regular and exercising every 30 – 60 minutes. It also covers using a laptop. The website displays a number of images showing both good and bad examples of posture and positioning.
http://education.umn.edu/kls/ecee/default.html

National Clearing House for Educational Facilities: US site on accessible playgrounds: http://www.edfacilities.org/rl/playgrounds.cfm

United States Access Board: A federal agency dedicated to access design.
http://www.access-board.gov/index.htm.
The ADA Accessibility Guidelines (ADAAG) for Buildings and Facilities can be found at http://www.access-board.gov/adaag/html/adaag.htm

22 Appendix 4 - Checklist for identifying physical barriers and barriers to the curriculum

The following guidelines are drawn from the Department for Education and Skills (2002b)[123] consultation document containing draft guidance for LEAs and schools on the new duty to plan to increase progressively the accessibility of schools to disabled pupils (the planning duty) which came into force in September 2002.

Section 1: Delivery of the school curriculum

Do teachers and teaching assistants have the necessary training to teach and support disabled pupils?

Are classrooms optimally organised for disabled pupils?

Do lessons provide opportunities for all pupils to achieve?

Are lessons responsive to pupil diversity?

Do lessons involve work to be done by individuals, pairs, groups and the whole class?

Are all pupils encouraged to take part in music, drama and physical activities?

Do staff recognise and allow for the mental effort expended by some disabled pupils, for example using lip reading?

Do staff recognise and allow for the additional time required by some disabled pupils to use equipment in practical work?

Do staff provide alternative ways of giving access to experience or understanding for disabled pupils who cannot engage in particular activities, for example some forms of exercise in physical education?

Is access provided to computer technology appropriate for students with disabilities?

Are school visits, including overseas visits, made accessible to all pupils irrespective of attainment or impairment?

Are there high expectations of all pupils?

Do staff seek to remove all barriers to learning and participation?

Section 2: Design of school to meet the needs of all pupils

Does the size and layout of areas - including all academic, sporting, play, social facilities; classrooms, the assembly hall, canteen, library, gymnasium and outdoor sporting facilities, playgrounds and common rooms - allow access for all pupils?

Can pupils who use wheelchairs move around the school without experiencing barriers to access such as those caused by doorways, steps and stairs, toilet facilities and showers?

Are pathways of travel around the school site and parking arrangements safe, routes logical and well signed?

Are emergency and evacuation systems set up to inform ALL pupils, including pupils with SEN and disabilities; including alarms with both visual and auditory components?

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[123] Department for Education and Skills (2002b) Consultation on Accessible Schools: Planning to increase access to schools for disabled pupils. Department for Education and Skills, Sanctuary Buildings, Great Smith Street, London, SW1P 3BT
http://www.dfes.gov.uk/consultations/conResults.cfm?consultationId=1170.

Are non-visual guides used, to assist people to use buildings including lifts with tactile buttons?

Could any of the décor or signage be considered to be confusing or disorientating for disabled pupils with visual impairment, autism or epilepsy?

Are areas to which pupils should have access well lit?

Are steps made to reduce background noise for hearing impaired pupils such as considering a room's acoustics and noisy equipment?

Is furniture and equipment selected, adjusted and located appropriately?

Section 3: Delivery of materials in other formats

Is information provided in simple language, symbols, large print, on audiotape or in Braille for pupils and prospective pupils who may have difficulty with standard forms of printed information?

Is information presented to groups in a way which is user friendly for people with disabilities e.g. by reading aloud overhead projections and describing diagrams?

Are there the facilities such as ICT to produce written information in different formats?

Are staff are familiar with technology and practices developed to assist people with disabilities?

23 Appendix 5: Disability Discrimination Act 1995/2005 Department for Transport Factsheet

The following information is drawn from the Department for Transport website: www.dft.gov.uk/access

23.1 Disability Discrimination Act - Transport Vehicles & Services

The Government is committed to an accessible public transport system in which disabled people have the same opportunities to travel as other members of society.

The powers in Part 5 of the Disability Discrimination Act 1995 (DDA) enable regulations to be made requiring all new land-based public transport vehicles to be accessible to disabled people, including wheelchairs users.

Regulations making all new trains, buses and coaches (used on local and scheduled services) accessible have already been introduced and we have announced our policy proposals for taxis.

Regulations are drawn up in discussion with the transport industry (both manufacturers and operators) and with the Disabled Persons Transport Advisory Committee (DPTAC, the Department's statutory advisers on the public passenger transport needs of disabled people). All the proposals are then subject to wider public consultation.

23.2 Rail

The Rail Vehicle Accessibility Regulations 1998 (RVAR) considerably improve disabled people's access to rail vehicles (trains, light rail, underground trains) and apply to all new vehicles that have entered service since 1 January 1999.
New measures contained in the Disability Discrimination Act 2005 (DDA 2005) will enable us to:
- Implement the Disability Rights Task Force (DRTF) recommendations on rail access by introducing an "end date" of no later that 1 January 2020 by which time all rail vehicles will have to meet RVAR an apply RVAR to rail vehicles when refurbished;
- Set up a certification regime to ensure that all rail vehicles meet the regulations before entering service; and
- Strengthen the enforcement regime.

Initial consultation on these measures was completed in 2004 and further consultation on draft regulations will follow in due course.

23.3 Buses and Coaches

The Public Service Vehicle Accessibility Regulations (PSVAR) 2000 affect all new vehicles, with more than 22 passengers, used on local and scheduled services, since 31 December 2000.

Since that date, new full size single deck buses over 7.5 tonnes and double deck buses have been required to be fully accessible to disabled people, including wheelchair users. All full size single deck buses over 7.5 tonnes will be fully accessible from 1 January 2016, and all double deck buses from 1 January 2017. New buses weighing up to 7.5 tonnes and coaches have had improved access for ambulant and sensory impaired passengers.

From 1 January 2005 <u>new</u> coaches and buses weighing up to 7.5 tonnes have had wheelchair access. <u>All</u> buses weighing up to 7.5 tonnes will be fully accessible from 1 January 2015 and <u>coaches</u> by 1 January 2020.

Proposals for access to other services and for small vehicles (22 passengers or less) will be subject to further consideration and consultation.

23.4 Drivers Conduct Regulations

The PSVAR only cover the construction of the vehicles. However we have also amended the Public Service Vehicles (Conduct of Drivers, Inspectors, Conductors and Passengers) Regulations. Those amendments include provision for reasonable assistance to be provided to disabled people.

The amended regulations (The Public Service Vehicles (Conduct of Drivers, Inspectors, Conductors and Passengers) (Amendment) Regulations 2002) came into effect from 1 October 2002.

With one exception, the duties only apply to buses that meet the PSVAR requirements. The exception covers changes to the rules covering the carriage of guide, hearing and other assistance dogs, which help disabled people.

23.5 Taxis

The Government announced its proposals for implementing the taxi provisions of Part 5 of the DDA 1995 on 28 October 2003. We intend to introduce regulations over a 10-year period from 2010 to 2020.
The Application of regulations will be varied to target first areas where accessible taxis will make the biggest impact in meeting the needs of disabled people and where additional cost will not have a major effect ('first phase' authorities).
Regulations will not apply to areas outside of the first phase. Instead, guidance would be issued to assist in deciding mix and design of vehicles appropriate for local conditions.
The effectiveness of the guidance and the introduction of accessible vehicles in these areas would be monitored and a view taken on the necessity of extending the regulations subsequently.
DfT are developing <u>technical specifications</u> and both these and the policy proposals will be the subject of a public consultation in due course.

In the meantime, we have issued guidance to local authorities in England and Wales who wish to introduce accessibility policies ahead of the national requirements.

23.6 Assistance Dogs in Taxis

Section 37 of the DDA came into force on 31 March 2001. This places a duty on licensed taxi drivers in England and Wales to carry guide, hearing and other prescribed assistance dogs in their taxis and to do so without charge.

Since 1 December 2000 local licensing authorities have been able to consider applications from taxi drivers and to issue certificates of exemption to those applicants who they consider merit a medical exemption.

23.7 Assistance Dogs in Private Hire Vehicles

The DDA 1995 did not originally include a power to extend this duty to the private hire trade but, following a successful Private Member's Bill, a similar duty was

introduced on 31 March 2004 for operators and drivers of licensed private hire vehicles.

Operators must now accept bookings made by, or on behalf of a disabled person travelling with an assistance dog and drivers must carry assistance dogs without making an additional charge for doing so. An exemption from these duties is available to drivers who have conditions, such as severe asthma, aggravated by contact with dogs. *There is no exemption available to operators.*

23.8 Access to Transport Infrastructure

Transport infrastructure such as stations and airports is subject to Part 3 of the DDA 1995, which covers access to goods, facilities and services.

Since 1996, it has been unlawful for service providers to treat disabled people less favourably than other people for a reason related to their disability.

Since October 1999, service providers have been required to take reasonable steps to change practices, policies or procedures, which make it impossible or unreasonably difficult for disabled people to use a service.

Since 1 October 2004, service providers have had to take reasonable steps to remove, alter, or provide reasonable means of avoiding physical features that make it impossible or unreasonably difficult for disabled people to use a service.

Part 3 of the DDA 1995 is essentially a civil rights provision and until case law has been established, it is not possible to say what will or will not be deemed as 'reasonable' in the eyes of the courts. The obligations must be considered on a case-by-case basis.

Further information on the DDA can be obtained from the Disability Rights Commission (DRC) helpline on 08457 622633.
The Department has published comprehensive guidance designed to inform the transport industries' response to the forthcoming DDA requirements. "Inclusive Mobility" outlines best practice on access to pedestrian and transport infrastructure from footpaths to car parking and the provision of facilities.

23.9 Lifting of Transport Exemption in Part 3

The Disability Rights Task Force recommended that the exemption for transport services in Part 3 of the DDA 1995 should be lifted, at least in part, to ensure that transport operators were prevented from treating disabled people less favourably that other passengers.

Following initial consultation in 2002, measures were included in the DDA 2005 and regulations (The Disability Discrimination (Transport Vehicles) Regulations 2005) have now been made. The regulations cover land-based public transport, vehicle hire and breakdown services and will come into force on 4 December 2006.

To help service providers understand their new obligations, the Disability Rights Commission (DRC) has drafted a statutory Code of Practice as they have done for other service providers. The Code, which includes practical examples of how the legislation might be applied in practice, was published in April and is available on the DRC's web site at www.drc-gb.org/library/publicationdetails.asp?id=517&sectionid=2.