

Introduction to Guidelines for Older Persons and Persons with Disabilities (Japan Industrial Standard X 8341) and Fujitsu's Approach to Standardization

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The Guidelines for older persons and persons with disabilities (Japan Industrial Standard [JIS] X 8341) were released in Japan in 2004 to help build an information-oriented society in which older persons and persons with disabilities can live comfortably. This standard is mainly intended for older persons and persons with long-term or temporary disabilities. It aims to assure and improve information accessibility from information processing equipment such as PCs, Web content, and electronic manuals. This paper introduces the background of this standard, specifically various U.S. laws, international standards, public guidelines available in Japan, and the movement toward standardization. Next, it explains how this standard is organized and how it was drawn up. It then excerpts some items from this standard to explain its concrete requirements and outlines Japanese efforts to develop an international standard and Fujitsu's approach to standardization. Finally, it describes some of the problems encountered when this standard is applied.

1. Introduction

The keywords representing Japanese society in this century are "aging" and "computerization."

Japan is quickly becoming an aging society without parallel in the world. The Statistics Bureau, Ministry of Internal Affairs and Communications estimated that Japan has 24.84 million people aged 65 or more (as of September 15, 2004), which is 19.5% of the total population (almost one in five).¹⁾ These figures represent both a record population and a record percentage for this age group. It is expected that this percentage will continue to rise and become 25.3% in 2014 (10 years later) and about one in four of the total population will be at least 65 years old. Regarding the second keyword, "computerization," 77.3 million people or about 60.6% of the population used the Internet as of the end of 2003.²⁾

Aside from these social trends, the Internet enables older persons and persons with disabilities to collect and provide a tremendous amount

of useful information, which was previously difficult for them to do on their own. For example, older persons and persons with disabilities who have difficulty going outside can now purchase products from around the world over the Internet while staying at home. Persons whose visual disabilities make it difficult for them to read can use a voice browser and a browser's zoom function to obtain the latest news. In other words, Internet technology is very useful for improving the activity of daily living (ADL) and quality of life (QOL).

Against this background, the demand for an information-oriented society in which older persons and persons with disabilities can also live comfortably continues to grow. In preparation for achieving this information-oriented society, standardization activities have been conventionally performed in and outside Japan to assure the accessibility of information and communications equipment and services so that many older

persons and persons with disabilities can use the Internet. Fujitsu is striving to improve information accessibility and is participating in standardization activities.

This paper introduces the organization of standard JIS X 8341, "Guidelines for older persons and persons with disabilities," which was established as a Japan industrial standard. It also describes the standard's creation, gives some examples of its requirements, and introduces some standardization activities for information accessibility in and outside Japan.

2. Development of JIS standard JIS X 8341

This section introduces various U.S. laws, international standards, and the movement toward standardization in Japan as the background of the establishment of the Guidelines for older persons and persons with disabilities.

Section 508 of the Rehabilitation Act (hereinafter, called Section 508) enacted in the U.S. in 1986 is the first act regarding the accessibility of information and communications equipment and services.³⁾ This act stipulates that organizations financially aided by Federal and national governments must procure information and communications equipment and services that comply with the technical standards defined in Section 508.

In Japan, the Ministry of International Trade and Industry (now called the Ministry of Economy, Trade and Industry) first considered the accessibility of information processing equipment in 1989 and released the "Description of Accessibility Guidelines for use of computers by the people with disabilities and elderly" in June 1990.⁴⁾ Then, in October 1998, the Ministry of Posts and Telecommunications (now called the Ministry of Public Management, Home Affairs, Posts and Telecommunications) released the "Directive on Accessibility of Telecommunications Facilities for Elderly and People with Disabilities."⁵⁾ The "Description of Accessibility Guidelines for use of

computers by the people with disabilities and elderly" served as a useful reference for establishing JIS X 8341-2 Part 2, "information processing equipment," which is described later in this paper. The Directive on Accessibility of Telecommunications Facilities for Elderly and People with Disabilities is currently being used as a reference for drawing up the draft of JIS X 8341-X, "Telecommunications Equipment," which is under current review.

The ISO/IEC Guide 71, "Guidelines for standards developers to address the needs of older persons and persons with disabilities," was issued in 2001 as an international standard for preparing standards and guidelines for older persons and persons with disabilities. In Japan, a JIS standard, JIS Z 8071, was released in 2003 under the same title. This standard is basically a translated version of ISO/IEC Guide 71.

The U.S. was also the first to support Web accessibility, and Section 508 was enacted in June 2001. Also, in addition to hardware and software accessibility, new accessibility guidelines for the Web were given in Section 1194.22, "Web-based Intranet and Internet Information and Applications."³⁾

Regarding an international industrial standard, the World Wide Web Consortium (W3C) established the Web Accessibility Initiative (WAI)⁶⁾ and then released guidelines concerning Web technology called the Web Content Accessibility Guidelines (WCAG).

In September 2000, to keep up with these trends within and outside Japan, the Committee for Study of Standardization for ICT Accessibility (abbreviated to JSA Information Barrier-free Committee) was established in the Information Technology Research and Standardization Center (INSTAC) of the Japan Standards Association. The task of this committee was to consider the establishment of a Japan Industrial Standard (JIS) regarding hardware, software, and Web content entitled "Guidelines for older persons and persons with disabilities."⁷⁾

3. Organization of Guidelines for older persons and persons with disabilities

This section introduces the organization of JIS X 8341, “Guidelines for older persons and persons with disabilities.” It also lists the group of related standards included in the standard.

These guidelines aim to assure and improve information accessibility for older persons and persons with disabilities so they can easily use information and communications equipment, software, and services. They consist of three hierarchies (**Figure 1**).

The first hierarchy, “Basic Standards,” became JIS Z 8071, described above. These standards are intended for people who refer to the draft JIS standards to create universal design (UD) standards.

The second hierarchy, “Sector Guidelines,” became the common guidelines for information processing equipment and services in general, for example, personal computers, cellular phones, software and information processing services. Specifically, it was made public as JIS X 8341-1, “Guidelines for older persons and persons with disabilities - information and communications

equipment, software and services - Part 1: Common Guidelines,” in May 20, 2004.⁸⁾ The third hierarchy, “Industry Group Standards,” defines the items that must be considered when planning, developing, and designing in each product field. JIS X 8341-2, “Guidelines for older persons and persons with disabilities - information and communication equipment, software and services - Part 2: information processing equipment,” (hereinafter, called Part 2) for information processing equipment such as personal computers was made public in May 20, 2004.⁸⁾ JIS X 8341-3, “Guidelines for older persons and persons with disabilities - information and communications equipment, software and services - Part 3: Web content,” (hereinafter, called Part 3) for Web content and electronic manuals was also made public in June 20, 2004.^{8),9)}

Currently, the draft standard for telecommunications equipment such as cellular phones and fax machines is under review by the Info-communication Access Council, and the draft standard for office-complex machines is under review by the Japan Business Machine and Information System Industries Association (JBMIA). These standards also fall under the third hierarchy.

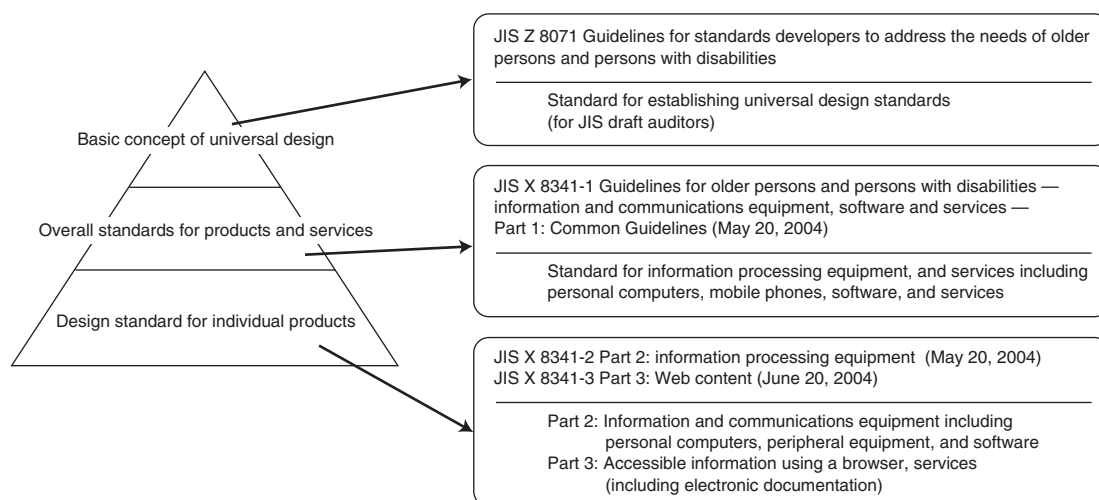


Figure 1
Configuration of “Guidelines for older persons and persons with disabilities.”

4. Establishing an industry group standard

This section outlines the factors that were considered when Part 2 and Part 3 were established so they would serve as a useful reference for planning, design, development, production, maintenance, and operation of easier-to-use information processing equipment and Web content. These standards are target-specific JIS standards, and it is important for the users that information processing equipment and Web content standards are easy to use and understand.

4.1 Basic concepts of industry group standard

The basic concepts for establishing both standards are as follows:

- 1) The contents of JIS Z 8071 (ISO/IEC Guide 71) and JIS X 8341-1 (common guidelines) are complied with.
- 2) The physical characteristics of older persons and persons with disabilities are taken into consideration whenever possible.
- 3) The items of the standard are classified from the viewpoint of product development based on an understanding and review of the concept in item 2) above.
- 4) Scientific and theoretical evidence is obtained whenever possible.
- 5) Development and common use of new technology are not prevented.

4.2 Description policy and chapters of industry group standard

This section explains the policy to be followed and considerations when creating the draft standard based on the basic concepts.

- 1) The standard is organized by element technology.

The standard is intended for a wide range of people, for example, orderers, planners, designers, developers, and people in charge of user support at the organization that provides the information processing equipment and services. The

standard is easy for these people to understand and concretely helps the people in charge of various element technologies of the information processing equipment and Web content to develop those technologies. The standard does not specify the items by equipment type or failure but is organized by interface element technology so it can also support new technologies.

- 2) To enhance effectiveness, the items of the standard are classified into basic requirements and recommended requirements.

Older persons and persons with disabilities can experience difficulties in using information processing equipment and services. It is therefore important to choose requirements that provide the greatest improvements in accessibility. In addition, because these requirements can be supported with existing technologies and the support work-hours are not excessive, they are specified as basic requirements. Requirements that are difficult to achieve with existing technologies but may be supported with future advances are specified as recommended requirements.

- 3) Easy-to-understand illustrations and references are added whenever possible.

The problems and background of accessibility when older persons and persons with disabilities use information processing equipment and services as well as the required functions of information processing equipment and services are added whenever possible. This is expected to help planners, designers, and developers understand the standard, combine the current technologies, and use new technologies to illustrate examples of better support methods.

- 4) The processes from planning to maintenance and operation are taken into account.

The following are essential when commercializing easy-to-use information processing equipment and services: 1) understanding, at the planning stage, various physical characteristics of users and the problems encountered in using equipment and services, 2) follow-up after information processing equipment and services are

provided, and 3) feedback to the next product development. To maintain the level of compliance with standards, it is important to consider accessibility in a wide range of processes, from the planning and design stages to maintenance and operation.

Table 1 lists the chapters of Part 2 and Part 3 and gives a brief explanation of each chapter.

5. Example requirements of the standard

Parts 2 and 3 describe the requirements by component for developers. However, this section describes the requirements in four groups selected from the viewpoint of the user. The four groups are Indication, Input, Recognition, and General.

5.1 Indication (legible)

1) Part 2: 6.1.2 Color and contrast

The brightness and contrast of screen information must be adjustable so it is easy to see.

2) Part 3: 5.5 a Color and shape

Information required to understand and operate Web content must not be based on color alone.

– Example of requirement 2)

A leader line is added to indicate the differ-

ence between areas so the contents of a pie chart can be understood. In **Figure 2 (a)**, a leader line is added and the areas are connected to text.

– Explanation of requirements 1) and 2)

In Japan, it is said that 5% (about 3 million) of males and 0.2% (about 120 thousand) of females are color-blind. In addition, it is very important to consider colors because older persons often have difficulty distinguishing low-contrast colorations. Based on this point, Parts 2 and 3 call for considerations to ensure legibility, for example, information should not be presented by color alone and attention should be paid to coloration.

5.2 Input (easy to input and operate)

1) Part 2: 6.4.9 Raised dots on keys

If many keys, buttons, and switches are adjacent to one another as in a standard keyboard, there must be a raised dot on the keys, buttons, and switches at the cue positions to help people locate them.

– Example of requirement 1)

Personal computer keyboards must have a raised dot on the F and J keys and the number 5 key in the 10-key pad.

2) Part 3: 5.3 g Operation and input

Hyperlinks and buttons must be easy to dis-

Table 1
Explanation of chapters in Parts 2 and 3.

Chapters of Part 2	Chapters of Part 3	Explanation
1. Scope	1. Scope	
2. Normative references	2. Normative references	
3. Definition	3. Definition	
4. Basic principles	4. General principles	Describes policy and common guidelines.
5. General guidelines		
6. Requirements for input/output of system	5. Specific requirements for development and production	Describes technical requirements that must be met when information processing equipment and Web content are developed and produced. Illustrations are added for each item to aid understanding.
7. Requirements for operation manuals	6. General requirements for assurance and improvement of information accessibility	Summarizes requirements to be considered in processes from planning to maintenance and operation. A wide range of people involved in planning, maintenance, and operation are requested to use this standard.

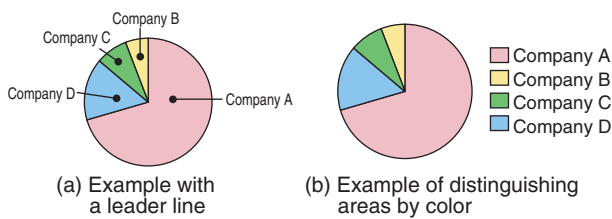


Figure 2
Graph display.

tinguish and operate.

– Example of requirement 2)

Hyperlinks and buttons must be large so they are easy to operate [Figure 3 (a)].

– Explanation of requirements 1) and 2)

Ensuring easy selection and operation of buttons and links indicated by applications and at Websites is as important a requirement as being able to see (obtain) information. Parts 2 and 3 stipulate that considerations should be made for older persons and persons with physical disabilities, for example, so that operation is easy even for people with trembling hands.

5.3 Recognition (easy to understand)

1) Part 2: 6.6.1 Memory-dependent operation

When performing an operation, users should not need to remember previous procedures or screen contents.

2) Part 3: 5.3 b Operation and input

When using input fields, the information to be entered must be made clear and each operation must be carefully considered.

– Example of requirement 2)

If a hyphen is required between number strings, this fact must be clearly indicated next to the input fields (Figure 4).

– Explanation of requirements 1) and 2)

The comprehensibility of applications and Websites depends on whether information is presented simply. This not only applies to older persons and persons with disabilities, but to users in general. Parts 2 and 3 require that considerations be taken for ease of recognition.



(a) Suitable sizes.



(b) Small sizes.

Figure 3
Example of button sizes.

Telephone number (Enter a hyphen.)
Example: 000-0000

Figure 4
Easy-to-understand entry field.

5.4 General (planning, maintenance, and operation)

1) Part 2: 7.5.1 Publicity of product support

Product support personnel must use multiple means to provide information to a variety of users. They must also stay in touch with persons with disabilities who use their products.

2) Part 3: 6.5 Requirements for user support

To maintain communication with users, Web content must include contact information that is easy to find and understand.

– Explanation of requirements 1) and 2)

As explained in Section 4, this standard gives guidelines for developers as well as a wide range of processes from planning to maintenance and operation. Parts 2 and 3 stipulate requirements for user support.

6. Efforts to develop international standards

This section introduces the activities conducted by Japan to develop international standards for information accessibility.

The Industrial Science and Technology Policy and Environment Bureau, METI, and the Japanese Industrial Standards Committee (JISC) served as contacts for proposing ISO/IEC Guide 71 at the ISO general meeting. Japan then played a leading role as a conference leader, and the standard was adopted as an ISO standard in 2001.

The Guidelines for older persons and persons with disabilities is attracting considerable international attention, and Japan has made strong efforts to develop international standards in this and related fields.

JIS X 8341-1 (common guidelines) has been introduced to European countries and the U.S. Also, development of an ISO standard for JIS X 8341-1 has been proposed and promoted under leadership of the JSA Information Barrier-free Committee (Committee for Study of Standardization for ICT Accessibility) established in INSTAC.

ISO TC159/WG1, "Ergonomics for people with special requirements," is a work group proposed by Japan to popularize the use of ISO/IEC Guide 71. It was established in 2004.

ISO/TS16071, "Guidance on the design of accessible [work, home, education] software," was drawn up based on the U.S. ANSI draft, North European guidelines, and accessibility guidelines of the Ministry of International Trade and Industry. Efforts to develop the ISO standard for ISO/TS16071 are currently underway.

7. Fujitsu's approach to standardization

Over the years, Fujitsu has conducted many activities to improve information accessibility. This section introduces Fujitsu's approach to standardization.

The author et al. participated in a project to draw up the "Description of Accessibility

Guidelines for use of computers by the people with disabilities and elderly." These guidelines served as a useful reference when we helped create the draft of Part 2 as members of the Accessibility Committee of the Japan Electronics and Information Industries Association.¹⁰⁾ It is safe to say that, in Japan, these guidelines promoted awareness of the importance of the accessibility of information processing equipment.

We also participated as WG2 members of the JSA Information Barrier-free Committee of INSTAC in a project to draw up Part 3. At this time, the Fujitsu Web Accessibility Guidelines,¹¹⁾ which are guidelines for Website production, served as a very useful reference for case studies. For example, Figures 2 and 3 were taken from the Fujitsu Web Accessibility Guidelines and many comments about cases and illustrations were adopted. In 2004, Fujitsu continues to be actively engaged in activities such as the production of a collection of FAQs to promote common usage and understanding of the JIS standards and cooperation with WAI to reflect the Japanese-specific descriptions of JIS standards in the WCAG.

Currently, we are participating as members of the Telecommunications Accessibility Standardization Subcommittee (TASS) in a project to draft JIS X 8341-X, "Telecommunications Equipment," which is under review by the Info-communication Access Council. In its capacity as a member of TASS, Fujitsu intends to reflect the expertise it gained by developing its FOMA Raku Raku PHONE in the JIS standard and help improve the accessibility of future communications equipment. (Raku Raku PHONE is a UD cellular phone that is easy to use, even by older persons and persons with disabilities.)

8. Future problems

Efforts to promote wide use of the Guidelines for older persons and persons with disabilities may encounter the following problems:

- 1) Publicizing the standard

Because this is a JIS industrial standard,

information processing equipment and service developers may become aware of it; however, it must also become widely recognized and understood by orderers, planners, designers, and people in charge of user support. The establishers of JIS standards must be made aware of this standard by providing information at Websites and introducing it at seminars.

2) Understanding of the standard's requirements

In Parts 2 and 3, illustrations and references are added whenever possible to make the requirements more understandable. However, because the current JIS describes requirements qualitatively, covers a wide range of equipment, and covers fields in which many new technologies are quickly developed, a practical guide and collection of FAQs must be provided so its readers can understand the illustrations and also understand what users need.

3) Review of compliance criteria

Criteria and checklists are required for orderers and developers so they can evaluate whether information processing equipment and services conform to this standard. Particularly, if the requirements are described qualitatively, considerations must be based on the JIS.

4) Global cooperation

There must be close cooperation with organizations such as WAI so the contents of internationally recognized standards such as Section 508 and WCAG become compatible with those of this JIS. This is also necessary to prevent a new import/export barrier.

5) Support of new technologies

Information-related technologies are developed quickly, and new technologies that are not currently anticipated may also appear. Therefore, the contents of standards should be periodically reviewed so that these technologies are supported in the future.

9. Conclusion

This paper introduced the circumstances leading up to establishment of standard JIS X

8341, "Guidelines for older persons and persons with disabilities," and existing laws and guidelines. Next, it explained the organization of this standard and gave some examples of the standard's requirements. It also outlined the efforts made by Japan to develop international standards and Fujitsu's approach to standardization. Finally, it described the problems in applying this standard.

This standard is designed to promote an information-oriented society in which products and services conforming to the requirements described in the standard are provided so users, particularly older persons and persons with disabilities, can enjoy a more comfortable life.

As a leading company in the information and communications equipment industry, we will improve the accessibility of our products and services so they conform to the JIS standards.

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