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# Guidelines for Universally Accessible and Usable Workplaces

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# **Guidelines for Universally Accessible and Usable Workplaces**

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## **1. Introduction**

Japan is rapidly rushing into an aging society. The population in Japan is estimated to reach a peak of 127 million in 2004 and then decline to 92 million in 2050, 39 percent of which will at that time be age 65 and over. After the workforce aged 15 to 64 achieved its peak number of 87 million in 1995, it continues to decline as follows: 86 million in 2000, 70 million in 2028 (estimated), and finally 49 million in 2050 (estimated) (National Institute of Population and Social Security Research, 2002). This dynamic demographic change will definitely transform future work environments.

The employment of people with disabilities is another critical issue in Japan. In 2001, the number of non-institutionalized people with physical and/or intellectual impairments aged 18 and over was estimated to be about 3.5 million, an increase of 8.7 percent since 1996 (Ministry of Health, Labour and Welfare [MHLW], 2001a, 2002a). Of this 3.5 million population, only 190,000, or 5.8 percent, were actually employed by public or private sector organizations. In addition, while the Law for Employment Promotion, etc., of the Disabled Persons regulates the employment quota that requires a private company to employ people with physical and/or intellectual disabilities at 1.8 percent or more of all employees, the average of the actual employment rates was only 1.5 percent in 2001 (MHLW, 2001b).

In order to be prepared for increasing diversity of employees, Japan Facility Management Promotion Association's (JFMA) Universal Design Committee (formerly called the Workplace Universal Design Study Team) is working to establish universal design guidelines for the workplace. At the World Workplace Japan 2003, we gave a presentation titled "The value of universal design in the workplace," through which we discussed current social streams associated with universal design in the workplace, mainly centered offices, and an application of the balanced scorecard to analyze the effectiveness of universal design (Shiokawa & Hagino, in press). As a sequel to this former presentation, this paper introduces an approach to developing guidelines to integrate universal design into office planning, as well as the results of a survey regarding the current awareness of universal design among Japanese facility managers.

## **2. Attributes of workplace universal design**

Let us begin with discussing the difference between universal design and barrier-free design. Barrier-free design exclusively focuses on elderly people and those with disabilities, evaluates built environments only from the viewpoint of physical accessibility, and conceptually takes "symptomatic measures" to eliminate environmental barriers for those people. On the other hand, the concept of universal design, according to its most common understanding, goes beyond the notion of barrier-free design and emphasizes an inclusive approach by which the physical, social, and psychological needs of all possible users are considered from the early stages of a design process and integrated into physical

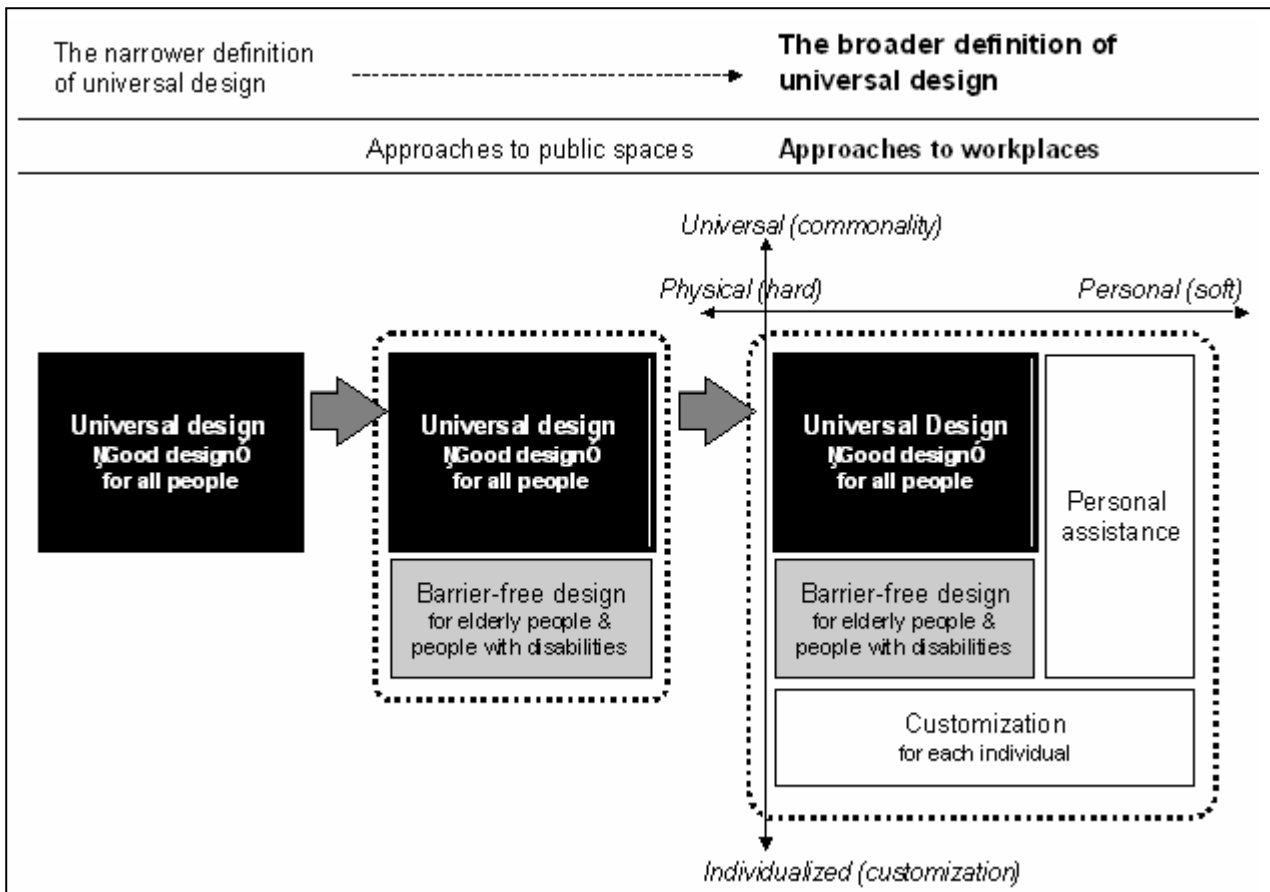


Figure 1: Attribute of workplace universal design

design solutions. “Bad design” may require additional barrier-free measures to adjust physical environments later, but “good design” does not.

As shown in Figure 1, we redefine universal design in the broader sense from a realistic standpoint. The horizontal axis is drawn from physical (hard) solutions to personal (soft) ones, and the vertical axis indicates the extent to which the solutions can be shared universally (commonality) or individually (customization). In addition to the notion of “good design,” by which we mean the general definition of universal design, our definition of universal design is broadened to encompass a barrier-free approach to adapting of the existing environments to the needs of people with disabilities, personal assistance as a supplement to physical accommodations, and environmental customization that will be appropriate for each worker.

Figure 1 also compares approaches to the workplace with approaches to public spaces. Public spaces tend to apply the highest common solutions that will benefit a broad range of unknown users as a whole. The concept of universal design appropriately satisfies the necessity of universality and commonality in public spaces. In contrast, the workplace generally targets specific users (employees), so its quality of accommodation can also be enhanced by personal, on-site, case-by-case measures, such as mutual considerations and informal arrangements among workers. Even many physical aspects of the workplace, such as workstations, seat height, lighting, air conditioning, and layouts of elements, can be relatively flexible and adaptable to the needs or preferences of individual workers. All of these are attributes of workplace universal design, which not only considers the collective needs of a group, but also remains sensitive to individual needs.

### 3. Outline of universal design guidelines for workplace planning

The first step in developing universal design guidelines is to identify critical success factors (CSFs) that play a key role in any planning and assessment of facilities. CSFs are analyzed according to five major phases of facility planning: Strategic planning, acquisition or lease of real estate, base building planning, interior planning, and maintenance and operation. Each CSF is followed by the description of its objective, the needs of users, and three levels of criteria that include exemplars to achieve the CSF objective.

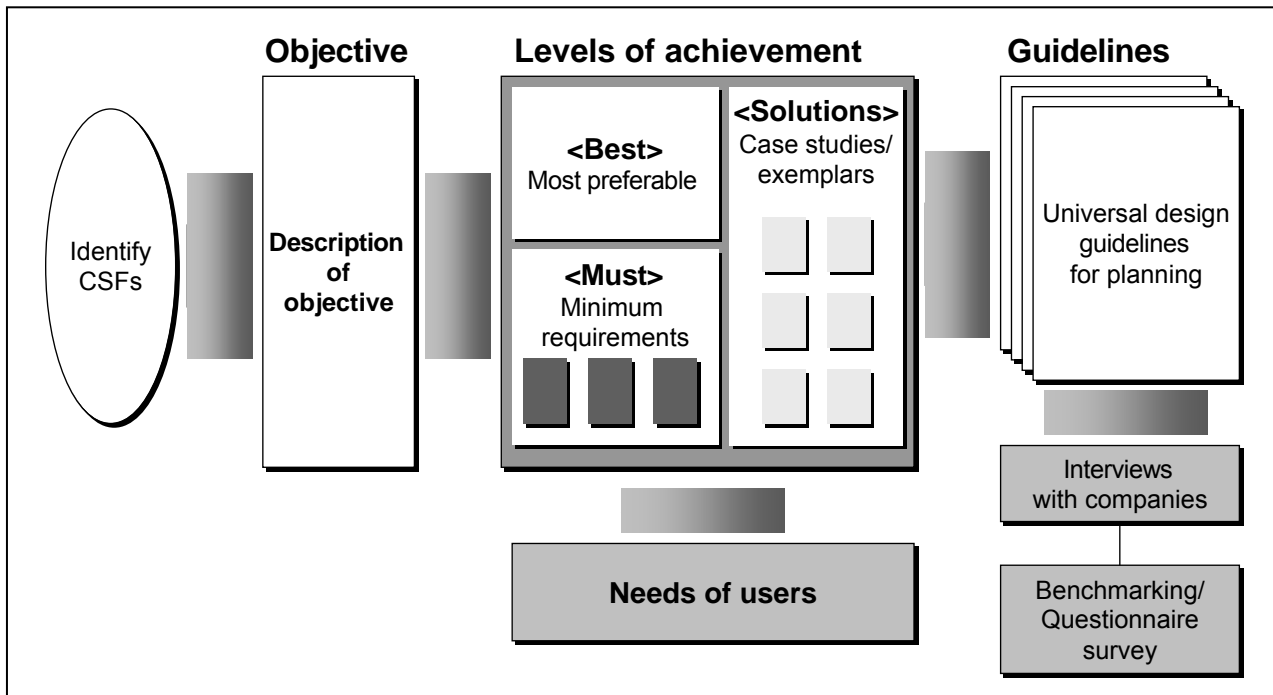


Figure 2: Workflow to develop universal design guidelines

### 4. Identifying critical success factors

It is important to clearly identify the factors that are critical in each of the five phases in order to successfully make the workplace accessible and usable for all individual workers. Here we discuss the basic categories of CSFs based on an illustrative case of new construction of an owned building.

#### **Phase 1: Strategic planning**

In this phase, the purposes of a project to infuse universal design into a workplace are clearly addressed. The purposes can vary depending on the particular circumstances of a company: To improve the value of assets, to reduce life cycle costs of a building, to increase productivity, to accommodate increasing diverse employees, to embody a corporate ideology, and so on. These purposes determine what attributes of users to be considered, the required levels of universal design, and the budget. The goals of a project are determined according to the purposes of the project; then CSFs are determined and identified as strategies to achieve the goals. Therefore, contents of CSFs and the importance of each CSF will be based on the nature of the purposes and the goals.

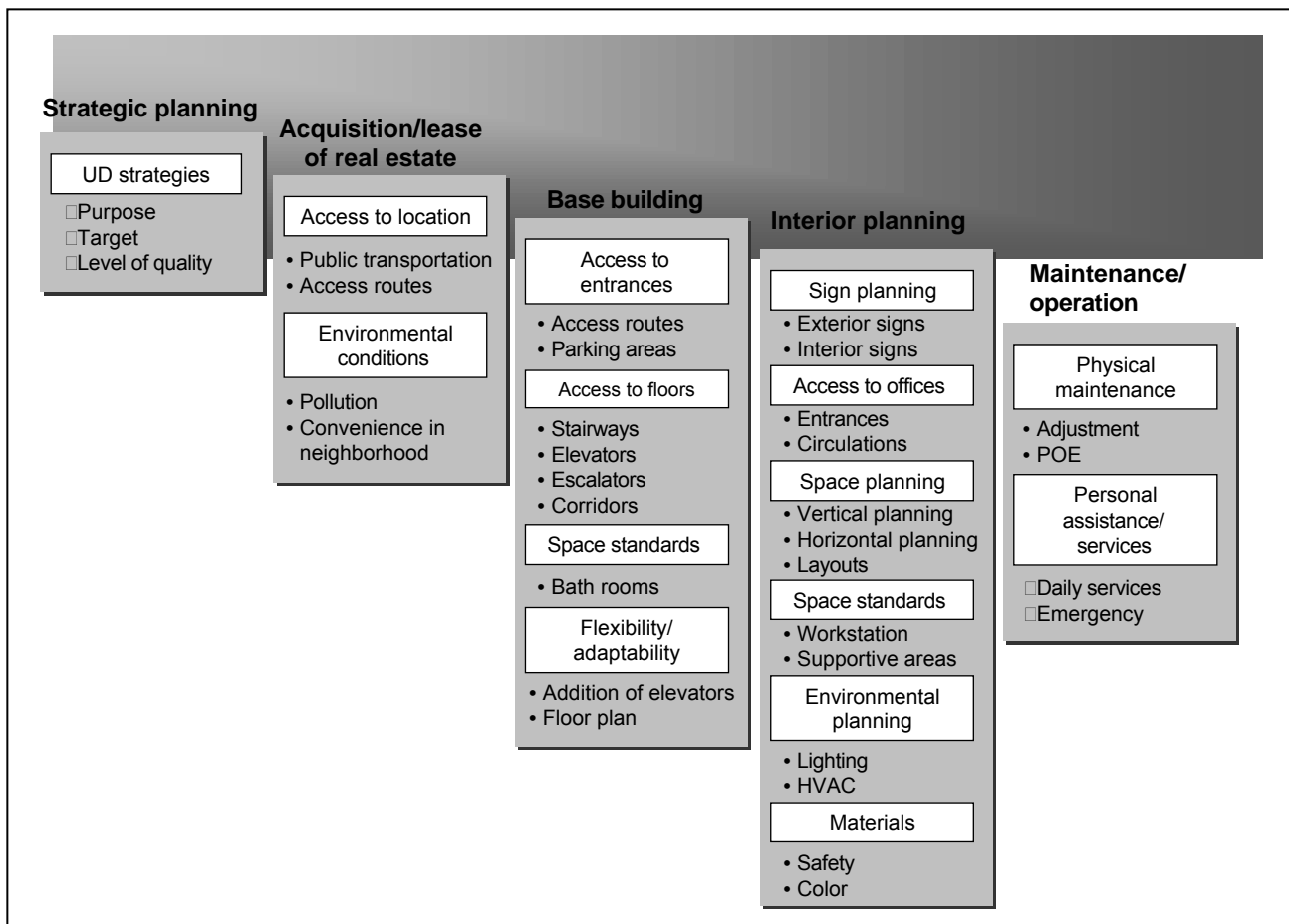


Figure 3: Critical success factors in a project

## Phase 2: Acquisition (or lease) of real estate

The most important consideration in this phase is the location of a facility. In general, the location is determined by the budget of the investment, relation to clients and/or customers, convenience of employees to commute, and influence of the location on a corporate image. From the perspective of universal design, access to and environmental conditions of the location are two of the major CSFs to be considered.

- 2-1. Access to a location: For the sake of those with difficulties in mobility who commute by walking, it is important to take account of distance, safety, and intelligibility of routes between a site and public transportation stops in the neighborhood. Car commuters need easy vehicular access from surrounding streets to the site.
- 2-2. Environmental conditions: Environmental conditions have a great impact on workers' health. Conditions as contamination of toxic substances, air pollution, noise, and vibration should be carefully examined. In addition, the convenience of the neighborhood is also taken into account.

## Phase 3: Base building planning

Base building is defined as the essential components of a building that are difficult to change later, such as configuration, structure, and building core. Barrier-free alteration of the base building is costly (sometimes impossible) compared with the costs of accessible

features applied to a new construction. Therefore, there is a great deal of financial advantage to applying universal design approaches to newly constructed buildings. To effectively manage the investment in and the life cycle costs of the building, it is important to maximize flexibility and adaptability to probable changes of circumstances in the future, including possible changes of accessibility regulations and de facto standards.

- 3-1. Access to entrances: *Parking areas, walkways, and vehicular ways within a site should be made safe, accessible, and easy to understand for both employees and guests.*
- 3-2. Access to floors: *Interior accessible routes, including stairways, elevators, escalators, and corridors, should be provided from the entrances to each floor. Thoughtful planning of signs, zoning, and way-finding can enhance ease of access. In addition, it is crucial to carefully plan evacuation routes so that they are effective even for people with mobility and sensory impairments.*
- 3-3. Space standards: *It is difficult to change size and shape of spaces associated with a building core. In particular, bathrooms must be made usable for elderly people and those with physical disabilities.*
- 3-4. Flexibility and adaptability: *Flexibility and adaptability of a building should be maximized as much as possible to allow for future changes of building use and/or legal requirements.*

#### **Phase 4: Interior planning**

Interior settings are relatively easy to change and controllable to meet the needs of a company. However, since interior planning determines the most immediate work environments to workers, the quality of such planning has a great impact on workers.

- 4-1. Sign planning: *Signs should be easy to understand for both guests and employees. Simple, intuitive, and perceptible signs are necessary to provide accessibility to people with visual and hearing impairments and foreigners who do not use the common language.*
- 4-2. Access to office space: *To increase accessibility from building core to office spaces, attention should be paid to circulation, entrances, and signs.*
- 4-3. Space planning: *The overall configuration of a workplace strongly affects accessibility and usability for workers. The most effective vertical and horizontal distribution of departments and functions, as well as office layouts within a floor, should be pursued along with consideration of the appropriate size of areas and costs.*
- 4-4. Space standards: *Workstation setting strongly affects usability and comfort for individual workers. It is preferable to adopt workstations highly adaptable to the need and preference of individuals and to configure those workstations in ways that will allow for flexible arrangement. It is also important to appropriately arrange common areas, such as business support areas (e.g.,*

meeting rooms, reception rooms), information management areas (e.g., OA rooms, libraries, storage), and amenity areas (e.g., refreshment areas, cafeteria, gymnasium).

- 4-5. Environmental planning: Since each person differently perceives the degree of illumination or temperature, it is important to provide appropriate lighting and air conditioning systems that allow for flexibility and ease of maintenance. Perceptibility can be heightened by finishing materials and color schemes for walls, floors, and ceilings, and combination of lighting with signs. This is particularly helpful for people who have low vision.
- 4-6. Materials: Finishing materials contaminated by toxic substances, such as formaldehyde and mold, can cause allergies, so-called "sick building syndrome," and other serious health problems. Such health problems must be prevented by eliminating contaminated finishing materials and improving the quality of air conditioning.

### **Phase 5: Maintenance and operation**

Comfortable work environments cannot be achieved only by initial planning of physical settings. It is equally, or more, important to pay attention to daily maintenance and operation in terms of both physical and personal aspects. Most of these aspects can be highly manageable by facility managers and users.

- 5-1. Physical maintenance: After starting operation, interior settings, including both workstations and common areas, should be continuously reviewed and, if necessary, modified to increase user satisfaction. Periodic post-occupancy evaluation is an effective way to find problems that need resolution.
- 5-2. Personal assistance and services: In many workplaces, informal arrangements and rules to help one another are made among workers. It is particularly important to establish explicit emergency manuals and regularly conduct evacuation drills so that workers with mobility and/or sensory impairments or those with language difficulty can know how to properly respond to an emergency. Daily services and assistance should also be provided in multiple modes. In addition to conventional personal assistance, use of the Internet and/or intranet is an effective way to increase inclusive communication among workers with differing abilities.

## **5. Relationship between the types of projects and the use of critical success factors**

In addition to (1) new construction of an owned building, other types of projects can include (2) alteration of an existing owned building or space, (3) purchase and alteration of a used building or space, and (4) lease of a building or space.

Figure 4 illustrates differences in the roles of facility managers according to the types of projects. Basically, CSFs can be used for both planning and assessment. Whether a set of CSFs that belongs to a particular project phase is used for planning or assessment

depends on the type of project. For example, In the case of new construction, all sets of CSFs are used as planning tools. Meanwhile, when a project focuses on the lease of a building or space, the quality of the real estate and the building or space can be evaluated by CSFs of Phase 2 (acquisition or lease of a building or space) and Phase 3 (the base building planning). In this case, the CSFs function as assessment tools.

- In the case of an existing owned building or space, building interior settings and maintenance/operation systems are frequently reviewed and changed as needed. Sometimes alterations of part of the base building will take place. For example, modification of entrances, elevators, and stairways would take place along with structural reinforcement of earthquake-resistance.
- For purchase and alteration of a used building or space, the quality of real estate and the base building is assessed by the CSFs associated with these phases. The scope of alteration is then determined by the assessment.
- In relation to a lease of a building or space, CSFs are used to assess real estate, the base building, and the interior settings. CSF-based planning is conducted for interior settings and maintenance/operation planning. The extent of interior

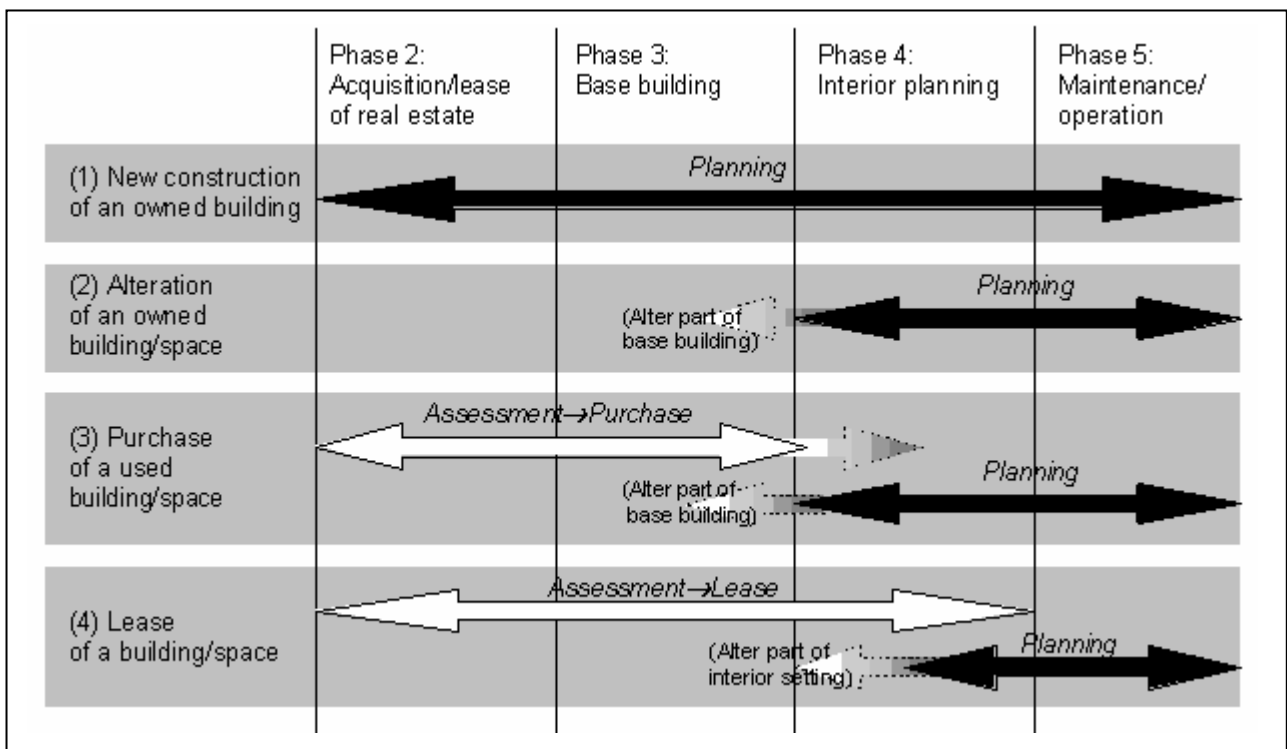


Figure 4: Use of critical success factors by the type of projects

planning will depend on the conditions of the lease.

## 6. Achievement of critical success factors

Each of the CSFs has its unique objective. Achievement of each objective and the eventual culmination of all achievements, can lead to successful workplace universal design initiatives that will indeed satisfy the purpose of a project. Criteria will provide the detailed means to accomplish the objectives. Following is the basic format of a “CSF achievement sheet.”



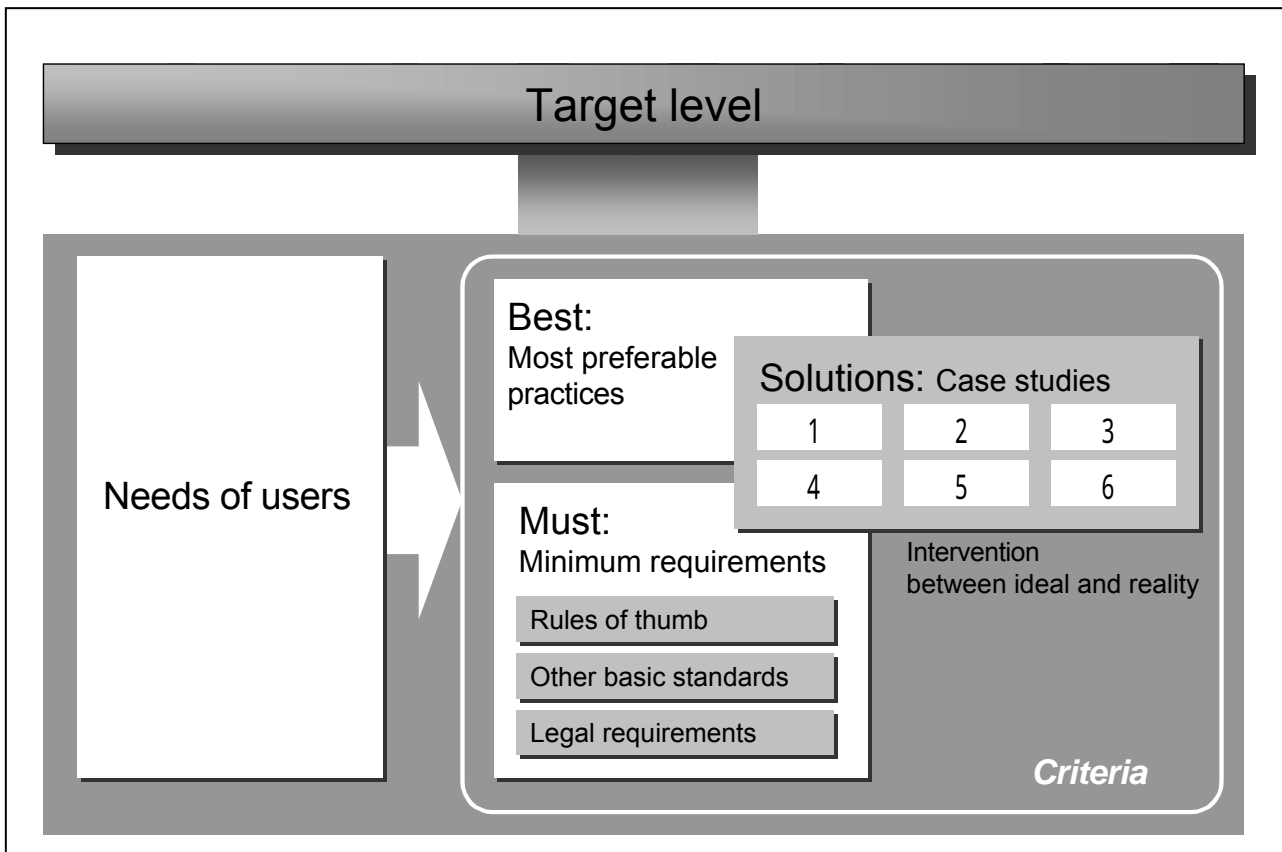


Figure 5: How to define the target level of a critical success factor in each project

(1) The description of an objective <what>:

This section addresses the qualitative statement of an objective of a CSF.

(2) The needs of users <why>:

This section provides the typical needs of users associated with a CSF (cf., The Kyoyo-Hin Foundation, n.d.). This section not only explains the bases of the following criteria, but also helps designers and facility managers find heuristic solutions appropriate for a particular situation. Note that the needs presented here are only examples, so designers and facility managers must study the real needs of their own users before and during a project.

(3) Achievement criteria <how>:

This section provides descriptive specifications that stipulate the quantities and qualities to be furnished. For a practical reason, the criteria are divided into three levels: best, must, and practical solutions. By comparing these three levels of criteria, and these criteria with the situations of each company, facility managers will be able to develop their own targets and define the solutions most effective for each situation.

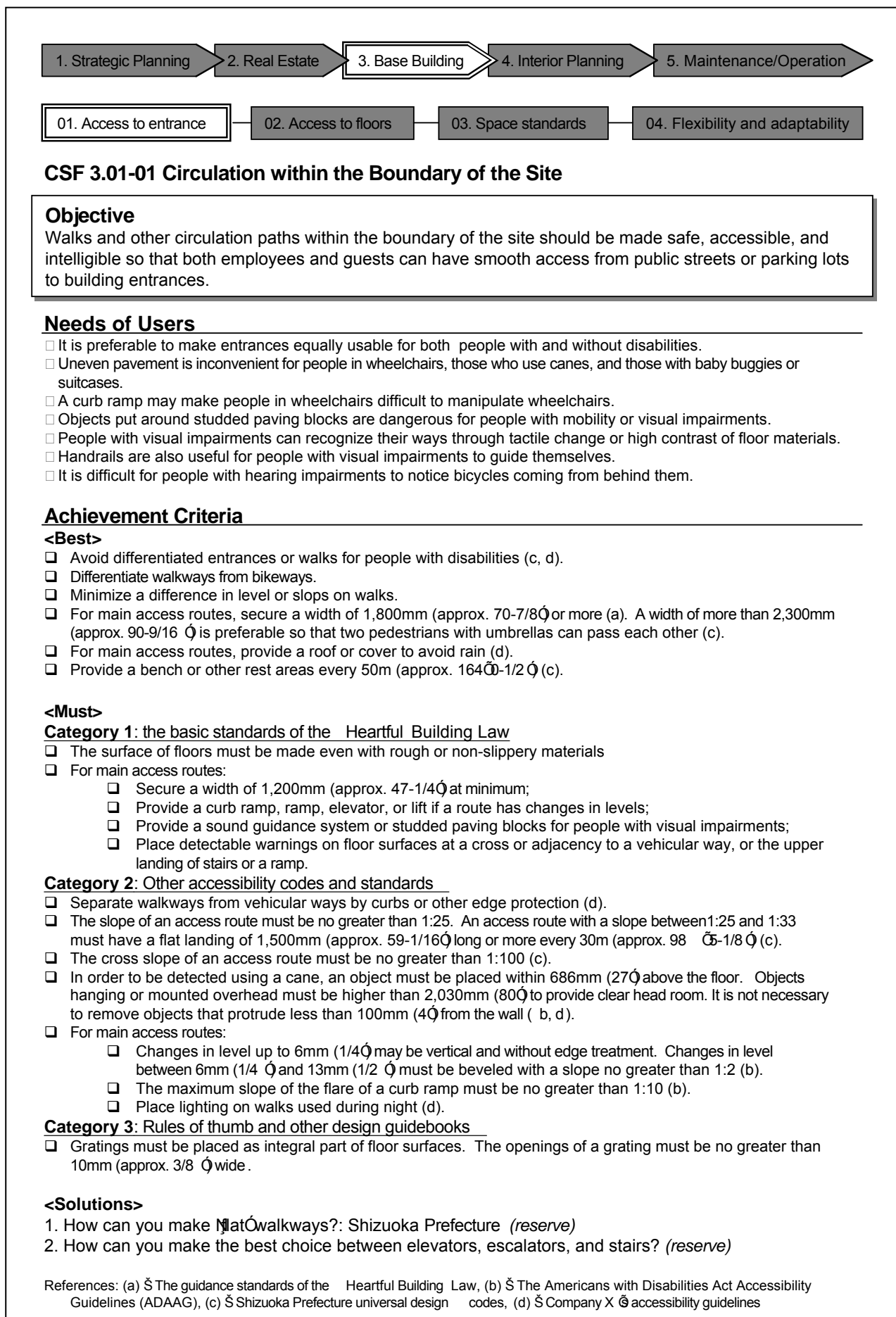
**Best:** Most preferable practices

These criteria should be accomplished as much as possible.

**Must:** Minimum requirements for accessibility and safety

Category 1 describes the Japanese legal standards regulated by the Law for Buildings Accessible to and Usable by the Elderly and Physically Disabled Persons (known as the Heartful Building Law). Category 2 covers other accessibility codes and standards, such as the Americans with Disabilities Act Accessibility Guidelines (ADAAG), accessibility codes issued by local

Figure 6: An example of the CSF achievement sheet



governments, and corporate accessibility standards. Category 3 includes so-called “rules of thumb” and other design guidebooks.

**Practical solutions:** Case studies

In many cases, practical interventions are needed between “best” and “must.” How to find such practical solutions can be best learned through case studies of corporate practices.

## **7. The awareness of universal design among Japanese companies: A survey summary**

From January 29th to February 14th, 2003, we conducted a survey to identify the present state of the awareness and practices of universal design among companies in Japan. A self-administered questionnaire consisted of fourteen questions with multiple choices. Since we had assumed that barrier free was more popular than universal design in Japan, some questions were designed to comparatively identify different circumstances of these two concepts. The questionnaire was distributed to 3,033 facility managers who subscribe to the JFMA mailing list through e-mail. Filled questionnaires were returned to JFMA via FAX or e-mail. Of all recipients of the questionnaire, 63 persons (2.1 percent) responded.

Regarding the profile of the respondents, 89 percent, or 56 persons, worked for Japanese companies or organizations, which are defined as companies whose major origins of capital is in Japan. 11 percent of the respondents, or 7 persons, represented international companies, defined as companies in Japan whose major capital comes from other countries. In terms of industry representation, 76 percent of the respondents, or 42 persons, belonged to service industries. 17 percent of the respondents, or 9 persons, worked in manufacturing, and 7 percent, or 4 persons, worked in government agencies, education, or other institutions.

The results showed that although the concept of universal design has not been popular in the workplace, many companies expect its introduction to their offices in the future. This result proves that there is a strong need for the development of universal design guidelines for the workplace. In addition, the low response rate may be a result from lack of interest or viewpoint on the issue among Japanese facility managers; it implies a need for further efforts to raise the awareness of the issue through education and communication. Following are the highlights of the results of the survey.

### ***General results***

- The results show that terms “barrier free” and “universal design” are highly known among Japanese facility managers. About 80 percent of the respondents answered that they knew the terms well.
- About 60 percent of the companies surveyed answered that universal design or barrier free was as part of their corporate belief. Meanwhile, about 50 percent of the respondents answered that their companies have incorporated universal design or barrier-free design into their principles for the workplace. Universal design is more likely than barrier free to be employed as corporate belief (33 percent vs. 17 percent, respectively).

- Currently, only 20 percent of the companies practice universal design and/or beyond the legally required level of barrier free measures; 15 percent of the others expressed their desires to adopt these measures to their workplaces in the future. Meanwhile, more than 30 percent of the respondents answered “don’t know” for both present and future practices, which implies that it is necessary to increase the awareness of the importance of universal design.
- Although more than 60 percent of the companies surveyed are positive about hiring people with disabilities in the future, more than 50 percent of the respondents thought that it would be unlikely that they would increase elderly employees. This attitude, in part, reflects the tendency of Japanese companies to lower the retirement age.
- Respondents most frequently cited improvement of a corporate reputation (60 percent), flexibility of human resources (53 percent), and an increase in worker satisfaction and productivity (43 percent) as expected advantages from adopting universal design or barrier free. On the other hand, the most frequently cited disadvantages they expected included an increase in construction costs (53 percent) and inefficiency of space usage (38 percent).
- More than 70 percent of the respondents were concerned about costs as obstacles to introduce universal design or barrier free, followed by understanding by management (22 percent).

### ***Comparison between Japanese and international companies***

The small number of international companies that responded does not allow us to precisely analyze a comparison between Japanese and international companies. However, some results explicitly do show different tendencies between the two groups.

- Not surprisingly, compared with Japanese companies, international companies are more likely to address “diversity” in terms of both corporate belief and workplace principles (67 percent vs. 13 percent, respectively). It can be inferred that this tendency is closely related to the fact that more than 70 percent of the international companies, or four times that of Japanese companies, have already adopted universal design or the legally required level of barrier free.
- International companies are more likely than Japanese companies to be positive toward hiring people with disabilities. However, with regard to the employment of elderly people, international companies show more negative tendencies than Japanese companies.

### ***Comparison among industries***

Similar to the above, since the distribution of respondents by industries was strongly biased, it is not achievable to compare tendencies by industries. One result, however, that would be worth noting is:

- Most of the companies in service industries addressed universal design or barrier free as part of their corporate belief, but this belief is not reflected in the principles of their

workplaces. Therefore, few of these companies take the initiative to implement universal design or beyond the legally required level for barrier free in their workplaces.

## 8. Conclusion

This report is part of ongoing research by the Universal Design Committee of the Japan Facility Management Promotion Association and presents our approach to developing universal design guidelines for workplace design. The guidelines are under development and we still need to add a great deal of information and facts to the guidelines in order to refine them. We also recognize the necessity to learn from more case studies, so that we can make the guidelines more practical and useful. The results of the survey we reported here have encouraged us to strive to deepen this research for the sake of both corporate executives and facility users. We strongly hope that this study will contribute to corporate management in the future as well as to the betterment of work environments where diverse workers, including elderly people and those with disabilities, can enjoy gainful work.

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