3 MATERIALS ASPECTS 3.1 EFFICIENT USE OF MATERIALS

MA 4 ADAPTABILITY AND DECONSTRUCTION

EXCLUSIONS

None.

OBJECTIVE

Encourage the design of building interior elements and building services components that allow modifications to space layout, and to reduce waste during churning, refurbishment and deconstruction.

CREDITS ATTAINABLE

3

PREREQUISITES

None.

CREDIT REQUIREMENT

a) Spatial adaptability

1 credit for designs providing spatial flexibility that can adapt spaces for different uses, and allows for expansion to permit additional spatial requirements to be accommodated.

b) Flexible engineering services

1 credit for flexible design of services that can adapt to changes of layout and use.

c) Structural adaptability

1 credit for designs providing flexibility through the use of building structural systems that allow for change in future use, and which is coordinated with interior planning modules.

ASSESSMENT

The Client shall provide a report prepared by a suitably qualified person presenting evidence as to how and the extent to which building adaptability and deconstruction is provided. The report shall include drawings and documents including building plans and detailed specifications together with elaboration and justification of specific design strategies that provide for the intended outcome. 1

Assessment will be guided by the checklists included herein. Additions to the list may be proposed at the discretion of the Client.

Where it can be demonstrated that applicable good practices in respect of structural and/or spatial flexibility, and/or flexibility in servicing have been adopted whenever feasible and at least 50% for residential development and 70% for other building types of the listed items in the relevant BEAM checklists could be achieved, the credit(s) shall be awarded. 2

SPATIAL ADAPTABILITY CHECKLIST

ASTM provides guidance for various types of buildings and uses [e.g.1, 2,3].

- use of adaptable floor plans, including large grids that can be subdivided, etc.
- spaces designed for a loose fit rather than tight fit;
- inclusion of multifunctional spaces; 3
- design that allows interior fitting-out to use modular and pre-fabricated components;
- spaces designed such that minimum disruption will be caused to

1 ASTM International. Designation E1692-95a Standard Classification for Serviceability of an Office for Change and Churn by Occupants.
2 ASTM International. Designation E1679-95 Standard Practice for Setting the Requirements for the Serviceability of a Building or Building-Related Facility.
3 ASTM International. Designation E1334-95 Standard Practice for Rating the Serviceability of a Building or Building-Related Facility.

occupants due to physical change;

- easy relocation of partition walls that causes minimum damage to flooring or ceiling systems;
- partition walls are fully salvageable;
- separating long-lived components from short-lived components to reduce the complexity of deconstruction and churning so as to facilitate the collection process for recycling; and
- use of interior partitions that are demountable, reusable and recyclable, etc.

FLEXIBLE ENGINEERING SERVICES CHECKLIST

- design that allows interior fitting-out to use modular and pre-fabricated components;
- using hybrid HVAC systems, with a balance between centralised components and distributed components;
- luminaires are easily relocated within ceiling grid or uplighters are used;
- air diffusers on flexible ducts can be relocated at minimum cost with minimum disruption to occupants;
- exhaust air ducts for special exhausts are easy to install, and space and capacity are available in ceiling and duct shafts;
- sprinkler heads are easily relocated within ceiling grid;
- pre-wired horizontal distribution systems in ceilings or floors, with spare capacity and easy access to accommodate change of workplace layouts; and
- reducing the use of embedded infrastructure for power, data and HVAC systems, etc.

STRUCTURAL ADAPTABILITY CHECKLIST

Reference may be made to various publications [e.g. 4]. Key points include:

- foundations allow for potential vertical expansion of the building;
- installation of isolation joints or other features avoid the potential for differential settlements and for progressive collapse due to accidental loading;
- reliance on a central core for lateral load resistance that allows for local modifications to the structure while maintaining complete structural integrity;
- wide structural grids;
- lower floors allow for heavier live load;
- sufficient height to lower floors to enable a range of uses;
- building envelope is independent of the structure (i.e., functionally discrete systems, with the interfaces designed for separation);
- versatile envelope capable of accommodating changes to the interior space plan;
- means of access to the exterior wall system from inside the building and from outside;
- structural floor system that accommodates a number of mechanical and electrical service distribution schemes based on

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4 Assessing the Adaptability of Buildings. International Energy Agency. Annex 31. Energy-Related Environmental Impact of Buildings. November 2001. http://annex31.wiwi.uni-karlsruhe.de/Annex%2031%20Assessing%20the%20Adaptability%20of%20Buildings.doc

different occupancies; and

- provision of more than the minimum spatial areas and floor heights, etc.

BACKGROUND

Change of ownership, changing use of premises, changing demography of family units, future growth and expansion etc., require modifications to the layout of most types of premises. Large amounts of solid waste can be generated during the remodelling of premises, such as demolition of walls and partitions. Designs that allow users flexibility in the layout of premises and designs that allow for dismantling during deconstruction can significantly reduce consumption of resources and generation of waste.

Adaptability refers to the capacity of buildings to accommodate substantial changes. The concept of adaptability can be broken down into a number of simple strategies that are familiar to most designers:

- flexibility, or enabling minor shifts in space planning;
- convertibility, or allowing for changes in use within the building; and
- facilitating additions to the quantity of space in a building.

Designs for adaptability can also increase the longevity of buildings, improve operating performance, and allow more efficient use of space, yielding economic benefits. The key design principles include independence of systems within a building, upgradeability of systems and components, and lifetime compatibility of building components. Examples include:

- foundations that allow for potential vertical expansion of the building;
- superstructures that rely on a central core for lateral load resistance to allows local modifications to the structure without affecting the building's structural integrity;
- reducing the use of embedded infrastructure for power, data and HVAC systems;
- the use of building systems that isolate structural and building enclosure systems used for housing building services components;
- the provision of lightweight partitions that can be moved to change layout;
- design that allows interior fitting-out to use modular and pre-fabricated components; and
- separating long-lived components from short-lived components to reduce the complexity of deconstruction and churning so as to facilitate the collection process for recycling; etc.

Deconstruction is the process of selectively and systematically disassembling buildings that would otherwise be demolished to generate a supply of materials suitable for reuse in the construction or rehabilitation of other structures. Designing for deconstruction facilitates the salvage of recyclable materials during disassembly. The benefits include the reduction of pollution impacts, saving landfill space, and increase in resource and economic efficiency.

Nov 20, 2012

BEAM Circular Letter 2012.110

Version: BEAM Plus New Buildings

BEAM Plus Assessment for Conversion of Industrial Building and Heritage Building Revitalisation Projects

Major conversion of industrial and heritage buildings will be assessed under BEAM Plus for New Buildings. This circular letter provides clarification of the assessment of these project types:

Adoption of Non-Applicable credits

The following four credits are recommended as "Non-applicable" due to the limitation of preserving the existing building structure:

- SA8a Wind Amplification
- SA8c Air Ventilation Assessment
- SA9 Neighbourhood Daylight Factor
- MA4c Structural Adaptability

However, if the building can achieve the above credits in its existing conditions, the applicants can still attempt to score the credits accordingly.

In addition, other credits can also be considered as "non-applicable" if it is demonstrated that the corresponding alteration works are restricted by local regulations or government policies. Compensatory measures could be considered as alternative.

Expanding the credits in Section 7 Innovations and Additions (IA)

Under Section 7 Innovations and Additions, the maximum number of IA credits will be increased to 10 Bonus credits plus 1 credit for BEAM Professional in order to encourage advanced practices and new technologies. The following provisions could be considered as a Bonus credit.

- Sustainability consideration on enhancing social value;
- Community engagement throughout the design and construction period

Applicant shall submit relevant information to BEAM Society Limited such as meeting records, the value of collective memory, etc. for consideration.

In implementing the above terms and conditions, the final decision on the proposed "Non-applicable" credits and "IA" credits will be subject to the discretion of BEAM Society Limited based on the assessment materials provided.

Signed :

Prof. John Ng
Chair of Technical Review Committee