

## Annex B: Factsheet on DfM and MiDAS

### Background

Traditionally, maintenance operations and requirements are often only considered when the building is handed over to the Facility Management (FM) service providers. This could result in the FM personnel having difficulties in carrying out maintenance activities efficiently and cost-effectively. For example, if a high-rise building's façade is not designed to be easily accessible for cleaning, temporary measures such as scaffoldings would have to be erected to enable workers to access and maintain the facade. This typically would lead to additional time and costs needed for maintenance, could cause inconvenience to building occupants or disruption to businesses, and could pose safety risks to the maintenance workers. The concept of Design for Maintainability is to integrate operations and maintenance considerations during the upstream planning and design stage of the project, so as to enable safe and efficient downstream maintenance operations.

### Benefits of DfM

#### A. Building Owners

- i. **Cost Savings.** About 60 - 80% of a building's total costs is attributed to the operation and maintenance needs over the building's lifespan<sup>1</sup>. If the design of a building takes into account its Operation & Maintenance (O&M) needs, it can result in significant amount of savings through more cost-effective, labour efficient, and smarter (tech-enabled) maintenance regimes, in the long run.
- ii. **Holistic sustainability.** DfM provides a systematic framework for consultants to reduce lifecycle costs and manpower need for maintenance while contributing to environmental sustainability.

#### B. Building Owners & Maintenance workers

- i. **Maintainable designs facilitate safe maintenance.** Many maintenance activities involve working at height, in confined spaces, and manual handling, etc. Therefore, minimising the need and frequency of maintenance through DfM reduces the risks to maintenance workers and potential liabilities to building owners. As such, DfM and Design for Safety (DfS) work hand in hand.

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<sup>1</sup> Source - <https://www.wbdg.org/facilities-operations-maintenance/operation-maintenance-planning>

## C. Developer and Designers

- i. **Competitive advantage at home and abroad.** The designer's ability to incorporate DfM right upfront represents a unique value proposition and advantage for our designers, whilst developers and building owners would be confident of a building which retains its value over time.

### **Taking DfM forward through FM transformation**

BCA has brought together industry, unions, and the government in a Tripartite FM Implementation Committee (FMIC) to formulate, oversee, and review the implementation of the transformation plans for the FM sector.

DfM was identified as a key pillar to support the FMIC's endeavours. A DfM Taskforce was set up to provide oversight on the (i) review and enhancement of the DfM Guide and (ii) development of the new voluntary Maintainable Design Appraisal System (MiDAS).

- Enhancement of DfM Guide. With inputs from developers and FM practitioners, the existing DfM checklist has been enhanced with new content – including Smart FM and design considerations promoting building automation. With greater emphasis on designing buildings to be digitally ready upfront to facilitate the adoption of smart technologies, downstream FM activities would in turn be made more efficient. The guide was also streamlined according to different building types to facilitate ease of use and adoption by industry practitioners.
  - New additions include a new section on Smart FM on “Digital readiness and automation”. Some design considerations that would be assessed are:
    - i. Remote web-based monitoring of Building Management System (BMS);
    - ii. Common or non-proprietary protocol for the network backbone of BMS;
    - iii. Use of sensors; and
    - iv. Provisions for future smart FM features.
  - The innovation section has been expanded with additional proven technologies and automation that could require design intervention. Examples include:
    - i. Smart bin;
    - ii. Smart toilet;
    - iii. Digital pest control;
    - iv. Autonomous Cleaning and
    - v. Mobile incident reporting management.
- DfM Guide on Municipal Infrastructure. BCA, MSO, NEA, PUB, LTA and NParks, in consultation with industry stakeholders, have come up with a new dedicated DfM Guide for Municipal Infrastructure. This is part of an interagency

collaboration to look at harmonising upstream design of public infrastructure to facilitate downstream cleaning and maintenance. It puts together agencies' relevant design guidelines and industry's best practices. The recommendations in the DfM Guide for Municipal Infrastructure are applicable to public facilities such as benches, linkways and street plantings as well as common spaces and amenities within private development projects

- *Develop the Maintainable Design Appraisal System (MiDAS)*

MiDAS assesses the **degree of maintainability of building designs** from the **lens of labour efficiency and cost-effectiveness of downstream maintenance regimes**.

- MiDAS identifies **critical (cost and labour intensive) maintenance items** that are **influenceable by design and presents a set of design strategies and best practices to address them**; thereby enhancing efficiency of maintenance tasks downstream. The scoring framework covers the key disciplines – **architectural, mechanical, electrical, and landscape** – and also comprises an innovation section to promote adoption of technologies.
- **Benefits of MiDAS**
  - i. Fosters **greater collaboration among designers, developer, and FM practitioners** to deliver better and more maintainable designs
  - ii. Promotes **holistic sustainability by considering not only environmental aspects but also economic and social** through greater cost savings and reduced reliance on manual labour;
  - iii. Enables **designers and developers, through the MiDAS score, to make more informed design decisions upfront and take a life cycle view of the development**, i.e. considering not only initial capital expenditure but also operating expenses.