The Application of NRM3 In Asset Data Classification in BIM: A Case Study Report
Background

Drivers of Building Information Modelling (BIM) in the United Kingdom

33% Whole Life Costs Reduction
50% Time Reduction
2025
Background

PAS 1192:2: CAPEX
PAS 1192:3: OPEX
NEW CLASSIFICATIONS TO ASSIST LIFECYCLE DELIVERY
Problem Statement

- Value of BIM for AM/FM Sector
- High BIM uptake in UK AEC Sector
- Can BIM deliver Whole Life Value for Existing Assets?
- Achievement of BIM Level 2 by April 2016?
- Can UK Vision be practically realised in Existing Built Assets?
Whole Life Concept

LCC Data Classification Framework

- Whole Life Cost
- Non-Construction Costs
  - Construction Costs
- Life Cycle Costs (LCC)
  - Renewal Costs
  - Operation Costs
  - Maintain Costs
- Income
- Externalities
  - End-of-Life Costs

Environmental Costs
Occupancy Costs
Environmental Costs

New Rules of Measurement 3 (NRM3):
Framework for forecasting and planning of future Renewal and Maintenance works projects in BIM environments

(Adapted from El-Haram et al., 2002)
Case Study Report

- **Project Deliverable:** A 30-Year Asset Lifecycle Plan for Client’s Estate including all associated asset information, which are to be easily transferable from the 3D model into their CAFM system.

- **Initial Challenge:** Inadequate Asset Information (in CAFM), which is a prerequisite to evaluating LCC. Therefore the following were undertaken:
  - Asset Knowledge at Data Level
  - Asset Knowledge at Visual Level

- \[ \text{Point Cloud Survey} + \text{Asset Collection Survey} = \text{Data-Visual Asset Information} \]
Key Outcomes

Point Cloud Survey: Asset Information in 3D
Key Outcomes

Structured Asset Data

- NRM was used to structure the asset data being collected and classified into groups, systems and types.
- ‘M+E’ = Asset group; ‘Heating system’ = The System and ‘Boiler’ = The Asset Type.
Key Outcomes

Forward Maintenance/Refurbishment Options in 3-D

VISUALISATION OF OPTIONS

1. Essential
2. Upgrade / Refurbish
3. Enhance
Challenges

COBie Taxonomy Showing Some Missing Data

- Lack of accurate asset information
- Unable to dump data into 3D Revit Model
- Impractical to use COBie due to unavailability of data
Solution

Developed NRM Asset Taxonomy and Asset Information Model

- An Asset Information Model (AIM) was developed (PAS 1192:3) to link 3-D Model and CAFM
- Incorporated Available COBie Fields
- Included Additional Non-COBie Fields required for LCC Evaluation e.g. asset condition; remaining life
- Influenced the Creation of Asset Information Model

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Summary

High-Level NRM 3 Taxonomy

- NRM 3 is an asset classification standard for structuring the cost data of assets relevant to the O+M phase of built assets.

- The result of this project was the development of a New Rules of Measurement 3 (NRM 3) taxonomy.
Summary

❖ Effectively structured asset information is a prerequisite to achieving a 30-Year Asset Management Lifecycle Plan.

❖ Data and Visual Asset Survey was undertaken to provide required Asset Information.

❖ NRM influenced the format and structure of collected asset data.

❖ Existing Asset data collected could not be dumped into a 3-D Revit model without deploying an Asset Information Model (AIM) (PAS 1192:3).
Summary

❖ Asset Information Model (AIM) is the appropriate BIM Model for Refurbishment Projects (PAS 1192:3).

❖ Asset information flow was achieved by connecting CAFM to the 3D model via AIM. For example, when an asset type such as a ‘Boiler’ is selected in the CAFM system, AIM generates all the associated asset information, which is displayed in the 3D model as a visual representation and location of the asset.

❖ Old built assets, especially with English Heritage status are challenged with asset data integrity due to age and hence incompleteness of data – hampering the use of COBie in such projects.
Thank You

Questions?