THE VALUE OF TESTING MMC SYSTEMS

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Overview

- Value engineering
- Structural testing
- Component tests
- Site testing
- Durability assessments
- Transportability studies
Value engineering

- Value engineering (VE) can be used at various stages throughout the whole process, from the design stage through to materials selection, manufacturing, transportation and build.

- The biggest savings can be made at the start of the process.

- VE is not just about reducing materials costs, it includes processes, construction methods, long-term use of the building and transportation.

- The full savings can easily off-set the costs of the VE process.
Value engineering design

- Design by Eurocode can lead to using larger material sections
- Designed connections
- Design for robustness for short periods of use
- Redundancy of fixings
Structural testing

- Compressive frame loading
- Wind loading
- Impact testing
- Racking loading
- Fatigue loading
- Floor loading
Structural testing
Structural testing
Component tests

- Chimneys
- Dormers
- Canopies
- Panel connections
- Balcony connectors
- Balustrades
- Bathroom pods
Component tests
Site testing

- Large-scale racking tests
- Water tightness
- Rain penetration
- Verification of loading points
- Impact testing
- Acoustic
- Thermal assessments
Site testing – Premier Modular

- Large-scale assessment of racking resistance of full modules
Site testing – Premier Modular
Durability assessments

- Accelerated weathering
- Condensation risks
- Water tightness
- Air tightness
- Extended 60-year assessments
- Thermal performance
Durability assessments

- Testing of the full system must be carried out

- It’s not sufficient to only test the individual components

- All components need to be CE marked individually

- The full system may fall outside of the exact scope of the available standards

- The most relevant standard must be chosen

- Composite action of the system is important
Hygrothermal test methodology - ETAGs

Cycles:

- 80 X 6 hour heat-rain cycles
  - Heat to 70°C and saturated with water at 13°C
- 5 X 24 hour heat-cold cycles
  - Heat to 50°C and freeze to -20°C
- 30 X 6 hour wet-freeze cycles
  - Heat to 20°C, soak with water for 8 hours and then freeze to -20°C
Durability testing – Berkeley Modular

- Condensation risk
Durability testing – Berkeley Modular

Perscriptive Guidance

BS EN ISO 13788 (Glaser Method)

BS EN 15026 (using Wufi Pro)

Computational fluid dynamics

Graph showing temperature, water content, and relative humidity over time.
Transportability studies

- Strain gauges on the frame
- Accelerometers
- Crack monitoring of the cladding
- Ultrasonic measurements
- Opening up of panel joints
Benchmarking levels

- The performance of the panels need to be benchmarked prior to lifting to establish any drop-off in performance due to lifting and transportation, this includes:
  - Measuring air leakage of panel joints
  - Thermal imaging to check insulation fill
  - Visual inspection of fixings
  - Visual inspection of cladding (particularly at reveals)
  - Penetration sizes
Transportability – WElink Homes

- Live strain readings on the frame taken from lifting onto stillages and on the full journey
- Fixed strain readings on the cladding system
Transportability – WElink Homes
Testing of systems ensures that building control, insurers and mortgage providers are satisfied that systems have adequate longevity and meet relevant regulations. This is achieved through:

- Structural assessments to ensure compliance with relevant fabrication / building standards
- Appropriate physical and environmental testing
- Assessment of fixings and ancillary components
- Monitoring of transportation, unloading and construction methods
Thank you

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