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CLADD:ISS - A STRATEGY FOR MANAGING CLADDING INTERFACES

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ABSTRACT

This paper covers the management aspects of Cladd:ISS, a UK Government funded research project to develop a standardised strategy for the design and management of window and cladding interfaces. Cladd:ISS covers interfaces between different cladding types and between the cladding and the frame, roof, building services, internal systems (walls, floors & ceilings) and secondary components such as sun shades, cleaning equipment and handrails. This paper explains the principles of CladdISS with access to process maps, action plans, management strategy, bibliography, advice on standards, materials, maintenance, joints, movement and tolerances. This will enable strategies to be developed to avoid the endemic problems occurring on site. It will also guide the management of the interfaces throughout the project.

1 INTRODUCTION

Interfaces, joints and connections between different elements or sections cause more problems than most of the rest of the building. There are challenges during design, manufacture and construction as well as implications throughout the life of the building. These challenges are particularly relevant for the building envelope. Here the joints must perform at the same level as the main areas of wall or roof, but the pressures on them are invariably much greater. They must keep out the weather, but at the same time, accommodate tolerances and inaccuracies and cater for movements both during construction and for as long as the building lasts. To exacerbate these difficulties the building designers usually want to minimise the visual impact of the joints (in fact many would do away with them completely if they could). In building, interface management is critical in a number of areas, including those of technical design detail, overall design, logistics, external influences and human relationships or organisational interfaces [2]. Organisational interface management concentrates on the interaction between the various parties; client, designer, contractor and specialist suppliers [1].

2 CLADDISS STRATEGY

CladdISS is an interactive CD ROM software tool that provides a strategy for optimising technical and management aspects of cladding interfaces. CladdISS is targeted at all disciplines associated with the building envelope especially; designers/architects, construction/ project managers, specialist cladding contractors, and engineers. The CladdISS project was a 3-year research venture funded by the UK government, the project was led by the authors with expert guidance from an industrial steering group. The research methodology included industrial

workshops, interviews, regular steering group meetings and a questionnaire. The strategy proposes to increase productivity, quality, reduce waste and reduce costs in design, manufacture, installation, and the building life cycle. CladdISS comprises four distinct steps:

1. Review interface management strategy: reviews the process for managing the interfaces which includes three sections; actions required at different project phases (Process map), programming implications for cladding interfaces and specialist cladding contractor & workpackage information.
2. Identify cladding types and other building elements
3. Classify interface profiles
4. Consider key issues and actions

2.1 Step 1 Review interface management strategy

The first stage of the interface standardisation strategy reviews the process for managing the cladding interfaces. Actions required at different project phases are the key to managing the cladding interfaces. CladdISS presents a process map that identifies significant cladding interface management actions and decisions in a project, from its inception through to demolition and decommission. The aim of the process map is to make the user aware of crucial management issues when procuring cladding interfaces inline with a generic cladding process. Shown below in figure 1 are the stages in the CladdISS process map that are based the process protocol [4]. The CladdISS review points advise the user that before progression to the next stage the review point outcomes must have been established within the project team

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Phase 0	Demonstrating the need	
Phase 1	Conception of need	CladdISS review 1
Phase 2	Outline feasibility	
Phase 3	Substantive feasibility and outline financial authority	CladdISS review 2
Phase 4	Outline conceptual design	
Phase 5	Full conceptual design	CladdISS review 3
Phase 6	Co-ordinated design, procurement and full financial authority	CladdISS review 4
Phase 7	Production information	
Phase 7a	Manufacture	
Phase 8	Construction	CladdISS review 5
Phase 9	Maintenance /facilities management	CladdISS review 6
Phase 10	Demolition/Decommission	

Figure 1 Project Phases

Figure 2 shows the CladdISS actions required in phase 2: Outline feasibility.

Main Project Process Protocol Actions & Decisions	Phase 2 Outline Feasibility Feasibility study for each option Re-assess site and environmental issues Revise business case
Cladding Process CP Actions & Decisions	Consider off site pre assembly. Obtain specialist contractors input. With reference to any environment issues (e.g. noise, dust) Develop outline planning constraints for aesthetic appearance Consider on site storage capacity Consider implications of cladding panel size(e.g. craneage) Consider the need for specialist cladding contractor input for cladding supply chain Consider if on/ off site testing is applicable, especially to the cost build up
Interface Management IM Actions & Decisions	Consider cladding interfaces with other elements and systems <i>* Note* "Increase in cladding types and building elements will increase interface complexity"</i> Consider compatibility between different systems/elements (e.g. precast on light steel frames).

Figure 2: Phase 2 of the CladdISS Process Map

2.2 Step 2: Identify cladding types and other building elements

The hub of the CD-ROM is the interface matrix (Figure 3) where the project team can identify the key interfaces to be considered. This covers interfaces between different cladding types and between the cladding and the frame, roof, building services, internal

systems (walls, floors & ceilings) and secondary components such as sun shades, cleaning equipment and handrails. The CD then displays a split-screen facilitating efficient comparison between the two interfacing elements.

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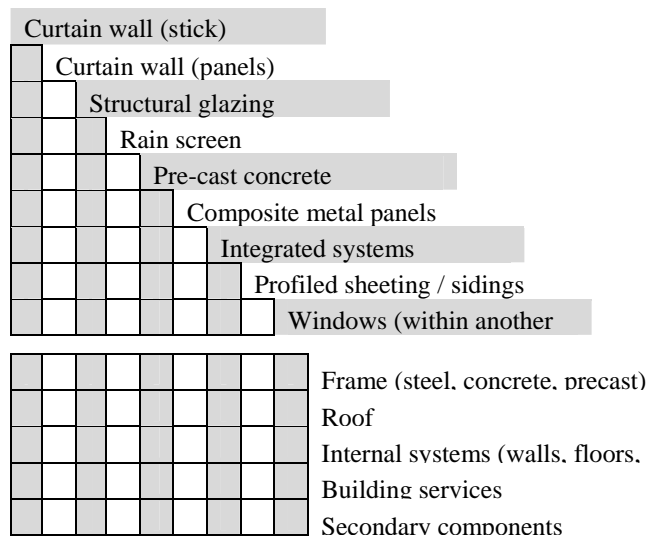


Figure 3: Interface Matrix

2.3 Step 3: Classify interface profiles

Step three is to classify the interface joint profiles. Cladd:ISS developed six generic interface profiles based on Michael Rostron's [3] joint classification diagrams, shown in figure 4. Throughout the process CladdISS will identify whether the profiles are

compatible with the different cladding types, if the profiles are shaded then they cannot be used with that particular cladding type. The project design team must then choose the joint profile for each interface.

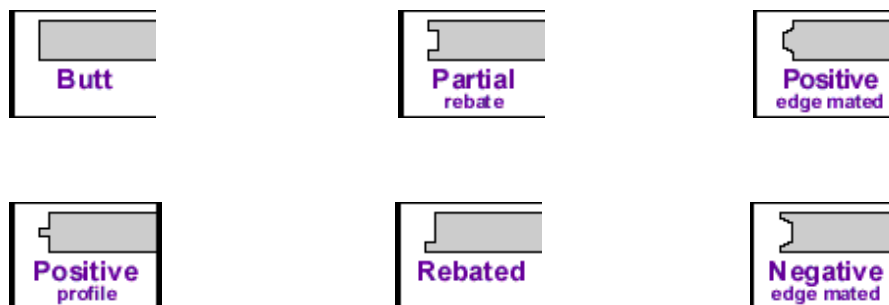


Figure 4: Joint Profiles

2.4 Step 4: Consider key issues and actions

After the initial interface detail has been considered by the project design team then the final step (4) should be discussed before the final design is agreed, this is consider the key issues and actions. These include; tolerance and deviation, seals and their zones, profile

characteristics, erection sequence, movement, maintenance and interface responsibility. Shown in figure 5 are the key actions and decisions extracted from CladdISS for the interface between structural glazing and precast concrete.

<p>Tolerance and deviation; the manufactured and erection tolerances for the precast concrete panels are in excess of the structural glazing. Locating and fixing the aluminium glazing channel prior to glazing arrival on site will obviate some of the tolerance, with the shuffling of the glazing to fit. The interface design must accept these deviations to ensure buildability. Seek advice from specialist cladding contractor on specific tolerance rates for the respective systems.</p>
<p>Movement; horizontal and vertical expansion and contraction of the glazing (including deformation under wind load) will be accommodated via the glazing channel. The movement rates of the concrete will (in part) also be accommodated via the channel, without placing undue stress on the interface zone. Lateral (in/out) movement will place higher stresses on the interface. The calculation of all likely movement is necessary to ensure the interface and glazed channel/glazing interfaces are not placed under undue stresses.</p>
<p>Erection sequence; the erection sequence will usually follow the following: 1. Precast concrete erected and located; 2. Glazing channel located and fixed; 3. Glazed panels erected. Ensure that the respective subcontractors leave their work of sufficient quality and cleanliness for the following trades.</p>
<p>Seal type and zone; the specified sealant must be able to adhere to the materials at the interface. The seal must also accommodate the likely movement. Seek sealant manufacturer / subcontractor advice.</p>
<p>Interface responsibility; the party responsible for the installation of the interface should be specified at the earliest moment. Responsibility must be assigned pre-tender to ensure that all elements are priced.</p>
<p>Maintenance; the primary maintenance concerns are the degradation of seal, either through UV breakdown, or chemical / biological degradation, and the effects of movement. Regular inspection and cleaning will alleviate the seal degradation issues (in areas of high UV radiation or exposed climatic conditions, location and composition of seal zone should be considered at the design stage - recessed joints, or other interface compositions). Excessive movement applied at the interface may cause the sealant to 'jump' out of the interface. If the interface will not allow the systems to move, failure within the systems may well occur. If possible, the joint width should be measured regularly to ascertain levels of movement, and allow prediction of possible failure.</p>

Figure 5: Example of key actions and decisions

3 CONCLUSIONS

Interfaces within construction will always continue to cause problems within the construction process, therefore there is a need to acknowledge and understand the problems as early as possible. CladdISS is a tool that addresses these problems. It is intended to be useful to the whole construction process so that the issue of interface management becomes part of the construction process, from inception through to Handover.

4 REFERENCES

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