

Automated Code Checking

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Industry Requirements

- Designs of building must comply with the BCA
- Deemed-to-satisfy provision of BCA and complexity of compliance checking
- Provide a tool for easy and quick code compliance assessment
- Assist designers in checking designs during sketch design stage and identifying potential problems earlier
- Assist building surveyors in automating checking process to reduce time and cost.



Designers



Building Surveyors



CRC Design Checker



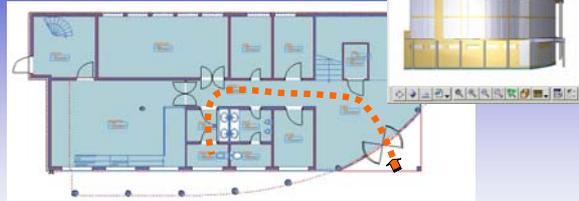
Building Codes

Objectives

- Investigate if automating sophisticated code checking on 3D building models (CAD) is feasible
- Provide a comparative analysis on SolibriModelChecker (SMC) and EDMModelChecker (EDM) against capability of automating design checking against building codes
- Develop two prototype systems using SMC and EDM that checks a suitably developed 3D CAD model for compliance with AS 1428.1 – Design for Access and Mobility
- Provide future development direction for applying automated design checking system in AEC in Australia.



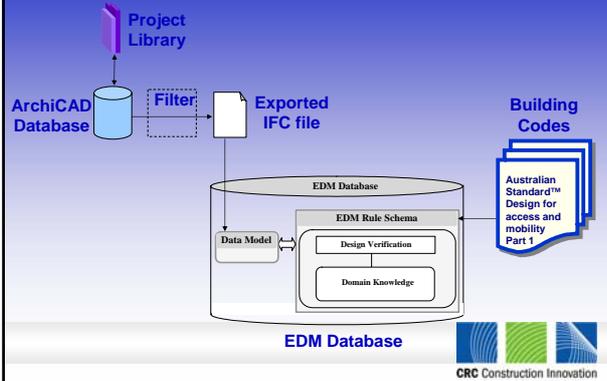
Checking Deemed-to-satisfy for disabled ACCESS



- Accessible entrance shall be incorporated in an accessible path of travel.



Design Verification



Domain-specific Knowledge for Interpretation

- ◊ **Clause 7.1 Provision of Entrances**
 - ◊ **Description:**
 - The requirements for entrances to buildings are as follows:
 - (a) Accessible entrances shall be incorporated in an accessible path of travel
 - ◊ **Constraint:**
 - There is an uninterrupted path of travel from an accessible entrance to an accessible space required.
 - ◊ **Objects:**
 - {Door, Space}
 - ◊ **Object properties:**
 - {pDoor_exterior, pDoor_accessible_required, pDoor_type, pSpace_accessible_required, pSpace_description}
 - ◊ **Object relationships:**
 - {Contain (Space, Doors): a Space contains Doors}
 - ◊ **Domain-specific knowledge for Interpretation:**
 - (to be implemented with functions and procedures)
 - ◊ **Find_AccessibleExteriorDoor (Doors)**
 - (IF pDoor_exterior and pDoor_accessible_required are found, THEN return AccessibleExteriorDoors)
 - ◊ **Find_AccessibleEntranceSpace (AccessibleExteriorDoors)**
 - (IF AccessibleExteriorDoors are contained by Spaces, THEN return AccessibleEntranceSpaces)
 - ◊ **Find_AccessibleSpaceRequired (Spaces)**
 - (IF pSpace_accessible_required is found, THEN return AccessibleSpacesRequired)
 - ◊ **Check_AnUninterruptedPath_from_AccessibleSpaceEntrance_to_AccessibleSpaceRequired (AccessibleEntranceSpaces, AccessibleSpaceRequired)**

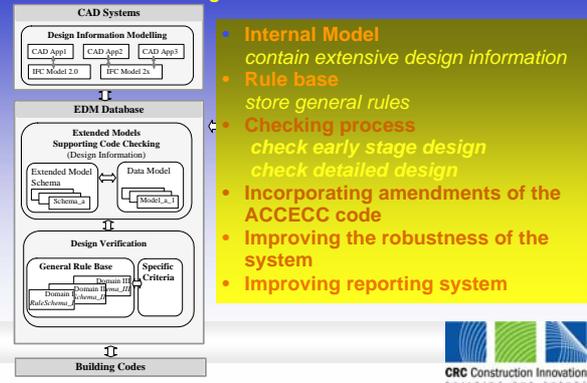


A Summary of Issues

- Flexibility of modelling extensive design information - EDM
- Flexibility of encoding building codes and domain knowledge - EDM
- Capability of automating design checking - EDM, SMC
- Flexibility of interfacing to object-based CAD systems - SMC, EDM
- Capability of providing friendly reporting systems and 3D visualization - SMC, EDM
- Capability of integrating with other applications - EDM



Future Developments – EDM Approach CRC CI Code Checking – Phase 2



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