



CRC Construction Innovation
B U I L D I N G O U R F U T U R E

Report Analysis of Maintenance Database Inputs

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1 INTRODUCTION

In the previous phase of this project, 2002-059-B Case-Based Reasoning in Construction and Infrastructure Projects, demonstration software was developed using a case-base reasoning engine to access a number of sources of information on lifetime of metallic building components. One source of information was data from the Queensland Department of Public Housing relating to maintenance operations over a number of years.

Maintenance information is seen as being a particularly useful source of data about service life of building components as it relates to actual performance of materials in the working environment. If a building is constructed in 1984 and the maintenance records indicate that the guttering was replaced in 2006, then the service life of the gutters was 22 years in that environment.

This phase of the project aims to look more deeply at the Department of Housing data, as an example of maintenance records, and formulate methods for using this data to inform the knowledge of service lifetimes.

2 DEPARTMENT OF HOUSING DATA

Access has been granted to a number of databases recording maintenance activities in Queensland Government Housing. We also have access to the Queensland Government Department of Housing Policy and Standards Document #7, Activity Codes for Maintenance and Upgrade Programs which gives the explanation for the code numbers used in the databases.

2.1 Activity Codes

Maintenance activities can be divided up into two categories: responsive and planned. Responsive maintenance is usually initiated through tenant requests. It is often the result of unforeseen circumstances such as fires, storms, break-ins etc and restores the property to an operational or safe condition. Planned maintenance includes actions that detect and prevent the gradual deterioration or failure of a property. It also includes actions performed to meet legal requirements contained in Commonwealth and State regulations, Australian Standards and Codes and Practices. Other works fall into the category of upgrades – dwelling improvements that extend the useful life of the property or increase its amenity. Minor works (<\$500) are also classified separately.

There are eight classifications for maintenance activities shown in Table 1, depending on the circumstances of the work required. Further classifications are shown in Tables 2-5.

Table 1: Maintenance Activity Classifications

MMF Works Classification	Explanation
UM	Unplanned maintenance
BM	Breakdown maintenance
IM	Incident maintenance
PM	Planned maintenance
PSM	Preventive service maintenance
CBM	Condition based maintenance
SM	Statutory maintenance
NBM	Non-building maintenance

Table 2. Codes for Responsive Maintenance Activities

SAP Activity Code	Activity Name	MMF class
MIS	Centrally managed responsive maintenance - contingency	UM
TEN	Tenant requested responsive /reactive property maintenance	UM-BM
100	Storm, Tempest and Flood damage	UM-IM
105	Fire, Impact and Other damage	UM-IM
110	Playground equipment	UM-BM
115	Area Office	UM-BM
120	Evaporative air conditioning	UM-BM
125	Smoke alarms	UM-BM

Table 3. Codes for Planned Maintenance Activities

SAP Activity Code	Activity Name	MMF class
MIS	Centrally managed planned maintenance contingency	PM
VUP	Vacant property maintenance	PM-SM
200	External repaint	PM-PSM
205	External pre-repaint maintenance	PM-CBM
210	Internal repaint	PM-CBM
215	Internal pre-paint maintenance	PM-CBM
220	Fence repairs	PM-CBM
225	Land vacant	PM-NBM
230	Land englobo	PM-NBM
235	Landscape MTCE- multi unit sites	PM-NBM
236	Driveways – pathways - parking	PM-CBM
240	Mandatory emergency services and inspections	PM-SM
241	Water services	PM-CBM
242	Rainwater Plumbing	PM-CBM
244	Arboreal	PM-NBM
245	Communal lighting – multi unit sites	PM-SM
250	Refuse service – multi unit sites	PM-NBM
255	Playground equipment	PM-SM
260	Evaporative air cooling	PM-SM
270	Preventative maintenance	PM-PSM
275	Floor covering	PM-CBM
282	Retaining walls	PM-CBM
284	Partial stump replacement / foundation repairs	PM-CBM
285	Electrical	PM-CBM
286	Window security locks	PM-CBM
287	Fan installation	PM-CBM
288	Site Drainage (storm water)	PM-CBM
289	Sewerage replacement	PM-CBM
290	Security / Community lighting	PM-CBM
298	Other maintenance	PM-CBM

Table 4 Codes for Upgrades Activities

SAP Activity Code	Activity Name	MMF class
MIS	Upgrades, centrally managed contingency	
300	Kitchen upgrade	
305	Floor covering – wet areas (>\$500)	
306	Floor coverings / finishing living areas (>\$500)	
310	Security screening and fitting	
315	Security lighting (no longer in use)	
319	Security / communal lighting	
320	Roof replacement	
325	New Fencing	
330	Bathroom upgrade	
335	Laundry upgrade (no longer in use)	
339	Laundry upgrade	
340	Fire safety	
345	Other upgrading (>\$500)	
350	Purchase dwelling upgrade	
355	Community managed facilities (>\$500)	
360	Site drainage (stormwater)	
365	Additions / alterations	
370	Site Upgrade (>\$500)	
375	Driveways / paths	
378	Lawn lockers / store sheds	
380	Full stump replacement	
385	Ceiling replacement	
390	Sewerage replacement	
395	Smoke/heat alarms	
400	Playground equipment	
405	Joinery / window upgrade (>\$500)	
410	Electrical upgrades	
420	Carport / garage installation	
425	Fan installation	
430	Disability modifications (>\$500)	
435	Estate Improvement activity	
440,441	Refurbishments (<\$20,000)	
445,446	Refurbishments (>\$20,000)	
450	Improvement to Vacant land	
455	Insulation ceiling / walls	
460	Evaporative air conditioning	

Table 5 Codes for Minor Works / Minor Upgrades

SAP Activity Code	Activity Name	MMF class
880	Floor covering – wet areas (<\$500)	
881	Floor coverings / finishing living areas (<\$500)	
882	Other upgrading (<\$500)	
883	Community managed facilities (<\$500)	
884	Site Upgrade (<\$500)	
885	Joinery / window upgrade (<\$500)	
886	Disability modifications (<\$500)	
887	Security screening and fitting (<\$500)	

3 PROJECT DATABASE REQUIREMENTS

The current project is expanding the software developed in the initial phase of the work which was focused on the prediction of service life for gutters in Queensland schools. A number of metallic building components are being included:

- Roofs
- Gutters
- Flashing
- Ridge capping
- Downpipes
- Windows
- Vertical supports
- Gang nail plates
- Fasteners
- Sub-floor supports and members

By comparison with activity codes listed above, it can be seen that maintenance activities are not currently categorized to the level of detail necessary to extract information for the service life of the separate components. Very little information specific to the ten components is listed in the current databases.

For example, code 320 relates to roof replacement. We are interested in data regarding roof sheeting, gutters, downpipes, flashing, ridge capping and fasteners, all of which may be replaced under the generic term of roof replacement, but no individual data is entered at present.

To be able to retrieve the sort of information required for the database significant changes would need to be made to the details entered into the system by the people carrying out the maintenance operations for the government infrastructure. The entries would need to include events relevant to the service lifetime such that the intervals between these events could be known. These events would also need to be classified in terms of the component involved and the significance of the event eg. minor, medium or major repair or replacement.

The individual building elements and operations are described in Figure 1. Once this was translated into an interface to collect the maintenance operation data, then a method would need to be formulated to generate service lifetimes from this data.

4 CONCLUSIONS

Due to Project personnel changes, this phase of the project was not able to be continued. An alternative method of getting information on the lifetimes of school building components was devised and carried out. This is reported on in Report 8.

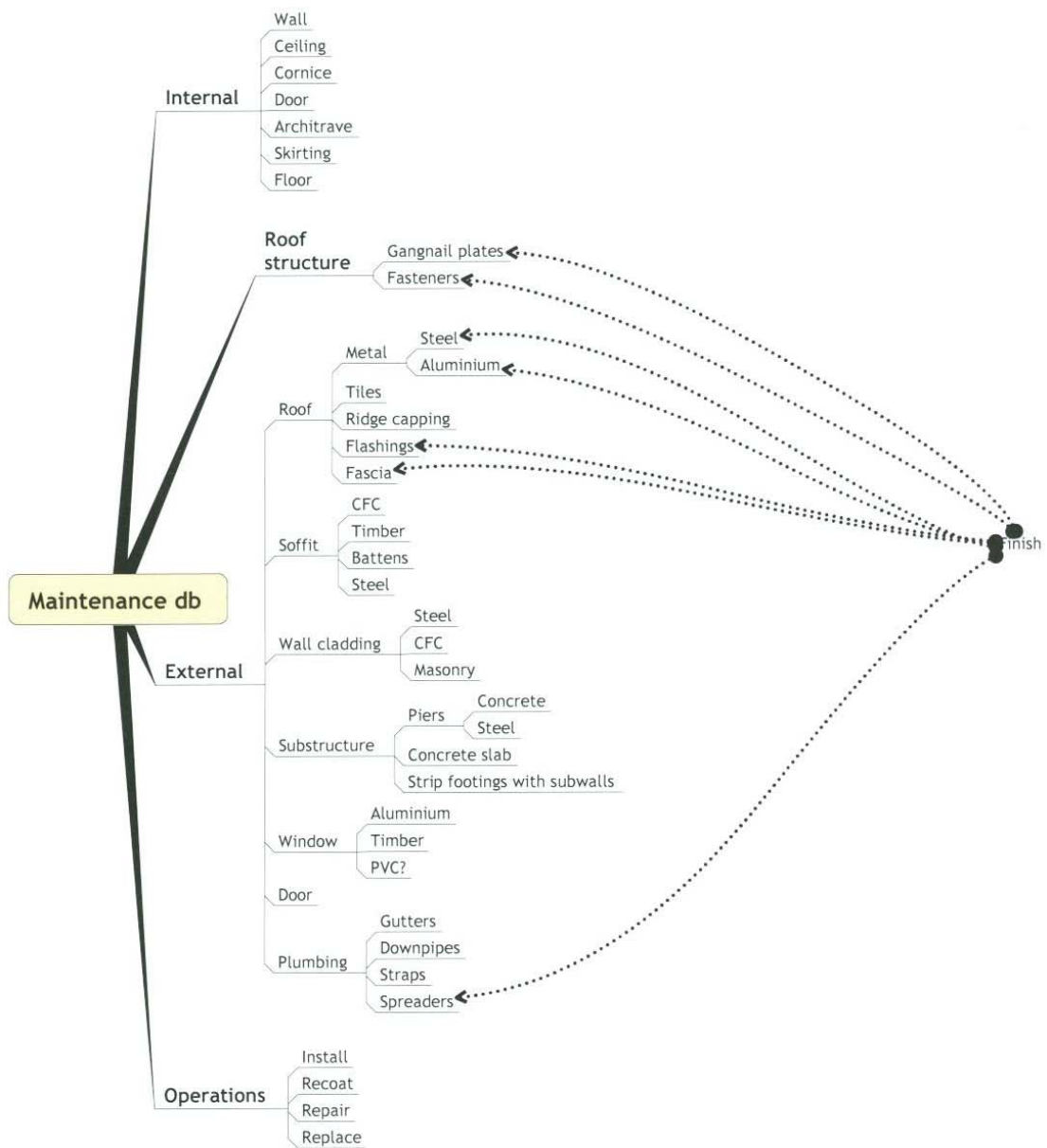


Figure 1. Schematic representation of building components and maintenance operations required for database



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