BUILDING REFURBISHMENT & MAINTENANCE

BUDGETING & CONTROLLING MAINTENANCE

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OVERVIEW

- MAINTENANCE COSTS
- PRICING OF MAINTENANCE WORKS
- MAINTENANCE BUDGETING
- BUDGET QUANTIFICATION METHODS
- CONTROLLING MAINTENANCE
- MAINTENANCE MANAGEMENT REVIEW PROCESS
- LEGAL ASPECTS OF MAINTENANCE
- USES OF ‘IT’ IN MAINTENANCE
LEARNING OUTCOMES

1. Know how maintenance budgets are determined and quantified.
2. Describe the main maintenance cost categories and the sources of maintenance costs.
3. Understand how maintenance work is estimated, priced and controlled.
4. Appreciate and identify the main legislation affecting maintenance.
ESSENTIAL READING

- H-WU: Learning Activity 2
- Chanter & Swallow: Chapter 6
- Seeley, I: Chapters 9 and 11 Appendices 2 to 4
MAINTENANCE CRITERIA

• COST EFFECTIVENESS
• VALUE FOR MONEY
• MINIMISE FAILURES/BREAKDOWNS
• MINIMISE WASTE
• COMPLIANCE WITH CODES
• PRESERVE/PROTECT ASSET
• MAXIMISE SERVICE LIFE
• MAX. AVAILABILITY/RELIABILITY

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EFFECTS OF REACTIVE MAINTENANCE

**Notes**
1. Original condition.
2. Erratic maintenance expenditure profile.
INTRODUCTION

• PROBLEMS WITH MAINTENANCE COSTS
  – High risk compared to New Build
  – Difficulty Estimating Accurately
  – Tip of an Iceberg

PROACTIVE v REACTIVE MAINTENANCE
  – See Graphs Illustrating their Cost Implications
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INTRODUCTION

Maintenance budgets

MAINTENANCE COST CATEGORIES

- PLANNED MAINTENANCE
- RECURRENT MAINTENANCE
- EMERGENCY MAINTENANCE

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INTRODUCTION

Maintenance budgets

• **Planned** – programmed works; inspected and individually/ competitively priced; monies allocated over an agreed period of time.

• **Recurrent** – Money set aside for routine or regular maintenance- repainting, electrical testing: normally rated works (£/m2)

• **Emergency** – due to timing can be expensive; budget typically only expected to allow repair – may need subsequent maintenance or capital budget.
MAINTENANCE COSTS DIAGRAMS

• MAINTENANCE SEE-SAW HYPOTHESIS
  – See Diagram

• RELATIONSHIP BETWEEN PREVENTATIVE and CORRECTIVE MAINTENANCE
  – See Diagram
SEE-SAW HYPOTHESIS

High Initial Costs  High Maintenance Costs

Low Initial Costs  Low Maintenance Costs

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Preventative v Corrective Maintenance

- Preventative maintenance intervention
- Critical level of functional requirement
- Item meeting functional requirements
- Item failing to meet functional requirements
- Time
- Preventative maintenance
- Corrective maintenance
ANALYSIS OF MAINTENANCE COSTS

• TYPES:
  o **Obligatory** – required by legislative control.
  o **Essential** – required to prevent failure or break-down.
  o **Desirable** – required to improve amenity but not necessarily essential.
  o **Avoidable** – unnecessary expenditure - vandalism; ineffective previous maintenance.

• COST COMPARISONS
  – **Cost Trends** – an increase may indicate a need for replacement or renewal. Conversely reduced costs overtime may indicate improved efficiency.
  – **Cost Units** - cost/m2, cost/employee.
  – **Performance Indicators** – industry or business KPI’s.
 SOURCES OF MAINTENANCE COSTS

- BUILDING MAINTENANCE INFORMATION (BMI)
- SIMILAR PREMISES COSTS
- PREVIOUS YEARS’ MAINTENANCE COSTS
- CONSULTANTS’ STUDIES
- PROFESSIONAL AND TRADE JOURNALS
- STANDARD BUILDING PRICE BOOKS
- GENERAL PRESS

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Annual Maintenance Costs (£/100m²)

- ESTATE HOUSING: £ 1,400
- FLATS: £ 1,700
- HOTELS: £ 2,800
- PRIMARY SCHOOLS: £ 2,400
- OFFICES (GENERALLY): £ 3,000
- OFFICES (AIR-CONDITIONED): £ 3,450
- FACTORY/OFFICE: £ 1,550
- SUPERMARKETS: £ 2,600
- RESTAURANTS: £ 3,100
- WAREHOUSES: £ 1,300

Source: BCIS (2006)
Annual Maintenance Costs - COMMERCIAL PREMISES PER EMPLOYEE/ANNUM

- FABRIC AND DECORATIONS: £ 560
- UTILITIES: £ 320
- ELECTRICITY: £ 550
- GAS: £ 90
- WATER: £ 70
- CLEANING: £ 250
- SECURITY: £ 240

MAINTENANCE BUDGETING (Global Budgets)

• DO FIRST IF AVAILABILITY OF FINANCES IS UNCERTAIN. Utilised to provide overviews, estimates or strategic budget where there is little information on condition of building stock.

• USE
  – Priority Listing – Used to rate or prioritise works based on condition, user requirements or needs, statutory req
  – Phase 1 Survey Results – Quick condition/valuation based survey used in property valuation reports.
  – Approximate Rate per m2 – budget calculated on overall floor areas & standards costing data from previous experience.

• PROS – Quick, can be accurate in experienced hands

• CONS – Can be inaccurate over short time; lack of detail.
MAINTENANCE BUDGETING (Detailed Budgets)

• **DO FIRST IF FUNDS ARE LIKELY TO BE AVAILABLE.** Provide a more accurate picture of overall condition & cost.

• **USE**
  – Phase 2 Survey Results – more detailed survey including inspection of key elements.
  – Schedule of Rates
  – Selective Tendering – key suppliers, manufacturers & installers being approached for estimates or budget costs

• **PROS** - accurate, less risky

• **CONS** - time consuming & costly when works not undertaken.
BUDGET QUANTIFICATION METHODS

• PERCENTAGE METHOD
  – Last Year’s Expenditure + %
  – Expedient But Crude

• FORMULA APPROACH
  – May be More Accurate/Realistic
  – Example: Rate x (Area x No.) +

• CONDITION BASED APPROACH
  – Most Effective
  – Derived From Phase 2 Condition Survey

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• CONTROLLING QUALITY:
  - effective site supervision; well trained operatives; specialist sub-contractors. Low budget equate to poor quality??

• CONTROLLING PROGRESS
  – Requirements/Supervision – effective site management; remote monitoring.
  – Work Ordered – effective programming tools (Gantt).
  – Backlog and Customer Satisfaction – user feedback.

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CONTROLLING MAINTENANCE

Gantt Chart

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CONTROLLING MAINTENANCE

• CONTROLLING FINANCE

– Total Budget Allocation – monitoring of overall spend with works advanced or retarded based on this spend.

– Individual Allocation – individual work packages or tasks controlled. More Control overall.
• **STATUTORY MAINTENANCE**
  – Extensive – many mandatory aspects.
  – Implications - recent manslaughter case relating to Legionnaires outbreak in England.

• **SAFETY**
  – CDM Regulations
  – Workplace Regulations
  – Fire Regulations
  – Lift Regulations
  – Health & Welfare Regulations

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The Construction Design and Management Regulations 2015, also known as CDM Regulations or CDM 2015, which came into force on 6 April 2015, are regulations governing the way construction projects of all sizes and types are planned.

Replacing Construction (Design and Management) Regulations 2007, CDM 2015 is the latest update to the regulations that aim to improve the overall health, safety and welfare of those working in construction.

CDM 2015 places legal duties on all involved in a construction project; duties which are enforceable by criminal law. CDM 2015 aims to ensure health and safety issues are appropriately considered during the development of construction projects. The overall goal is to reduce the risk of harm to those who have to build, use and maintain structures.
• BUILDING (SCOTLAND) ACT 2003
• FIRE (SCOTLAND) ACT 2005
• BUILDING ACT 1984 (in England & Wales)
• ENVIRONMENTAL/PUBLIC HEALTH ACTS
• DISABILITY DISCRIMINATION ACTS 1995 and 2005
• LANDLORD AND TENANT LAW
  – Common Law in Scotland
  – Landlord & Tenant Acts (in E&W)
• HOUSING ACTS 2006 (Scotland) 2004 (in E&W)
USES OF IT IN MAINTENANCE

• MAINTENANCE DATA COLLECTION
  (info or data collated by sensors; ex temp, humidity, etc)

• MAINTENANCE PROGRAMMES
  (Gantt or programme chart)

• QUANTIFYING MAINTENANCE COSTS
  (Use of computer software to generate cost data)

• COST-IN-USE ANALYSES

• WHOLE LIFE CYCLE COSTING

• DISCOUNTED CASH FLOW
  (all three RESULTS CAN BE CONVERTED INTO GRAPHS)

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• PURPOSE
  – Property Asset Register
  – Quantify State of Repair
  – Pricing and Control Costs
  – Manage Budgets

• METHODS
  – Paper-based
  – Audio
  – Computerised
SOFTWARE PROGRAMMES FOR PLANNED MAINTENANCE

• TYPICAL USES
  – Condition Surveys
  – Pricing and Cost Control of Maintenance Work
  – Budgeting and Planning Work
  – Scheduling and Controlling Work