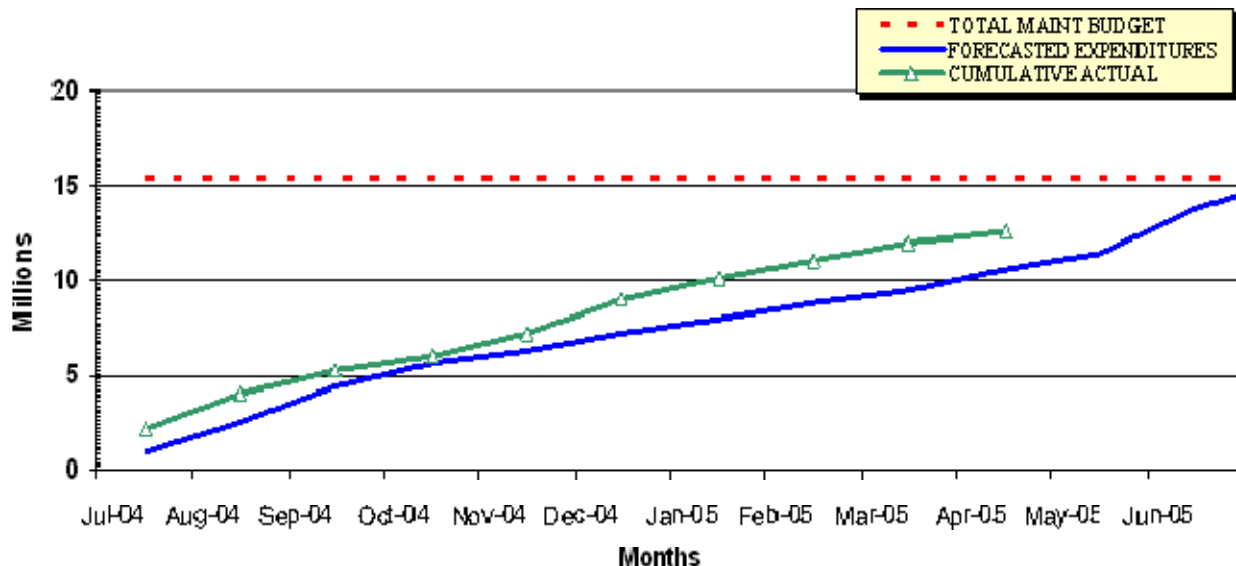




Industrial Maintenance Roundtable NSW
Common Interest Workgroup (CIWG) Report
from Meeting on August 23rd 2007

Development and Management of Maintenance Budgets CIWG



This document is compiled from discussions during the NSW IMRt Common Interest Workgroup (CIWG) on Development and Management of Maintenance Budgets.
Document Compiled by Peter Todd - [NSW IMRt Facilitator](#)

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Development and Management of Maintenance Budgets

Attendance List

Attendee	Organisation
Matthew Richards	ANSTO
Kynan Baker	Caltex
Jason Cachia	Caltex
Andrew Davies	Delta Electricity
Glenn Macfarlane	Hunter Valley Ops RTCA
Greg Moore	Hunter Water
James Taylor	OneSteel
Peter Todd	SIRF Roundtables
Peter Charlton	SIRF Roundtables
Nandu Marathe	Sydney Water
Mahen Mahendrarvarman	Sydney Water
John McKeon	Sydney Water
Ian Lee	Sydney Water
Peter Philipson	Tomago Aluminium

Introduction

The NSW Industrial Maintenance Roundtable (IMRt) held a Common Interest Work Group (CIWG) meeting on Development and Management of Maintenance Budgets focusing on how best to manage the processes used and the level of detail included in maintenance budgets by different IMRt members. This meeting was held on the 23rd August 2007 and was kindly hosted by Sydney Water at their offices at Palmer St Gilford West. The meeting was attended by 14 people from 9 different organisations. The information and ideas included in the document came directly from the discussions that took place at the meeting.

The meeting was started by two detailed presentations from the host Sydney Water on their overall budgeting process and the process of budgeting for their contractors. The scope of the meeting included discussions on maintenance budgeting processes, maintenance strategies, ownership of budgets, cost reduction processes and an ideal maintenance budgeting process. The NSW IMRt has held only one CIWG meeting on this topic in 2007.

The IMRt is a maintenance networking organisation coordinated by SIRF Roundtables (SIRF Rt) www.sirfrt.com.au. This report gives feedback to meeting attendees and other interested parties. The meeting included the development of a comparison matrix, which is shown on the following page. This matrix was filled out by attendee organisations to enable comparisons to be made between organisations on the issues discussed.

Maintenance Budgeting Comparison Matrix

Maintenance Budgeting	Hunter Water	Caltex	Delta Electricity	Coal & Allied	ANSTO (Reactor)	OneSteel (Sydney Steel Mill)	Sydney Water Corp	Tomago
What is your Financial Budgeting Process/ Timeline?	Start approx 6 months before the new financial year	Start 5 months prior 1 months work	6 months prior 6 weeks work Annual Process	3 Months	Divisional preparation starting in Dec. Submitted to SM March & Board in April. Returned to Division ??? (normally July)	Not Sure - New in role Inherited Budget	Annual Budget Process Year Jan - December with separate owners having different financial years Quarterly reforecasts moving to monthly re-estimates	~2 months up to 18 then review Approval September Year Jan - December with separate owners having different financial years Quarterly reforecasts moving to monthly re-estimates
What is your average yearly maintenance and capital Budgets?		\$45M in 2007 (OPEX) \$37 M average prior (OPEX) \$60M CAPEX	Op \$20M pa Cap \$20M pa	\$100M OPEX \$40-50M CAPEX- 2008 \$32M	OPEX - \$1.6M CAPEX ?	\$7M Maintenance	Maintenance \$150M Capital \$250M	Maintenance ~\$55M Proactive ~20% major
What level of detail is included in your maintenance budget? % Larger Jobs % routine baseline. Use ZBB?	High level budgets "Upgrades" Capitalised -each one itemised No ZBB	40% Routine - Higher level detail 60% Major Jobs - Itemised detail No ZBB	High Level Budget - Major Projects Routines/ PM -> Labour Budget ZBB - Risk Analysis/ Checks of Budget	All major equipment component X Units	Routine labour & materials/ parts, Training, Tooling	Mix of Routine, Larger and Shutdowns (Annual) No ZBB	We don't use ZBB Budget will be grouped under 4 maint types PM CM, BM, PS for each service provider Also quantified in total lab, materials, tools, special sub-contractors Budgets are assigned @ facility level	Significant detail. Plant areas to machine level, Resource type, Responsibility team, Maintenance Strategy Type, month, Top down -Total constraint and resource type constraints(eg Labour manning) Bottom Up approach - Machine area budgets(moving to some ZBB soon) Utilising SAP (official budget and reporting) + TM1 (budget development and reporting)
How is your maintenance strategy linked to your maintenance budget?	Not specifically Budget tends to drive strategy due to past strategy data	Not directly linked	Directly Linked Budgets & Strategies jointly developed	Direct	Its Not	Not at this stage Seen as Desirable	WE have tech maint plan that has Maint Mix (PM time based, Condition Based, Meter Based, RTF etc) based on Strategic Direction	Not Directly Have a plant and department strategic plan (annual).
Who has responsibility/ ownership for the budget? (Down to what level)	Maintenance Manager	Reliability and Production Superintendents	Team Leader	Maintenance Superintendent	Maintenance Engineer	Maintenance Superintendent Aiming to lower some responsibility to next level - Maintenance Leaders	Strategic Operations Manager	Business Unit Leader & Delegation to Area Leaders Moving to Team Leaders
What software/ systems do you use to help create your budgets?	Excel/ Ellipse	SAP + BW (Business Warehouse) Excel	Excess -> Ellipse	Ellipse	SAP & Excel	SAP -> Excel -> SAP	Maximo, FMIS, Excel	SAP , TM1, Excel
What process are being used to help reduce maintenance costs & how is the results integrated into the budget?	None really - Some upgrades to lower cost equipment	RFS - Improved contract & work issuing to contractors Monthly OPEX Review/ Analysis	Challenging Targets Risk Analysis	Reliability Engineering	Strategies not mature enough yet to drive improvements Cost not being captured appropriately yet	Targeting Reliability outcomes in front of cost, Volume Dilutes Cost. Will be trying to line strategy to budget	Process & Maint Improvement Program (PMIP), PM Reviews, Risk Analysis	Continuous Improvement & Lean 6 Sigma FMEA Improved projects reporting with alignment to accountability
What training is available for assist with budgeting and what support is available from accounting?	Informal We have our own Accountant	Nil/ Very Limited We have our own Accountant	APESMA - MBA On the job working with Finance group	Nil in-house. On job experience	None Organizational Procedures available (From Finance Division)	Some on special SAP Reporting Not much on other processes, Particularly monthly reviews	Accountants are embedded in the business and some financial training for the individual	Limited training material and not specific enough Cost Co-ordinator from financial department supports budgeting and cost reporting
How is the risk from forced reduction in budgets assessed?	Informal	Informally Rankings	Formal Risk Analysis Software "Know risk" Individual Analysis on spreadsheets - Excel	Management approval of CAPEX	No experience in this	Direct \$ of Breakdowns + \$ of Downtime & \$ Consequential Damage (Plant or Customer)	No formal process but prioritisation based on risk analysis	Major work - structured risk assessment process and ranking Routine - no quantified risk or benefit process - routine subject to % cuts in Material/ Contractors, Labour fixed to manning

Development and Management of Maintenance Budgets

Sydney Water Maintenance Budgeting Presentations

To start off the meeting John McKeon and Mahen Mahendrarvarman from Sydney Water did an initial presentation each on ‘Overview of SW’s Mechanical & Electrical Maintenance Budgeting and ‘Maintenance Budget for External Contactors’ respectively. The key points of the two presentations are listed in Appendix 1.

John’s presentation dealt with the management of both operating and capital budgets. Their budgeting time line starts in April, goes to board early May, is modified as required in May/ June and starts in December. There is a large capital budget (typically 5 new pumping stations a year) and the SW board directs the focus of spend to long term strategic and political goals. Major Periodic Maintenance (MPM) such as Digester overhauls are treated separately from routine maintenance. The rough structure of the budget is given below. CAPEX replacements are used where equipment improvements are being made (eg increased equipment life) and OPEX is used where equipment is being replaced with a like item. There are often large changes in CAPEX budgets year to year due to specific projects (eg desalination plant).

Routine Repairs & Maintenance				OPEX		CAPEX	
BM	PM	CM	PS	MPM	Ops Ex	Rel. Replace	Renewals
M\$60 to M\$70				M\$300	M\$40	M\$220	M\$30

Mahen presentation was on how the budgeting for external contractors in managed. Costs are collected at the job level to be able to compare cost from contractors and SW’s internal labour force. There was significant discussion and agreement on the difficulty of comparing costs between internal and external labour and the difficulty of quantifying the benefits of ownership, local knowledge and relationships that internal resources typically have. The long term routine maintenance contracts (Transfield) are based on a bid cost with a 1.5% reduction per year after that. There are also performance based incentive payments.

Other Meeting Attendees and Overview

The meeting attendees were either directly involved with or had a strong interest in Maintenance Budgeting. James the **OneSteel** representative was from the Sydney Steel Mill Rolling Mill Plant and they have a focus of long term reliability based reductions of maintenance costs. International Benchmarking has shown that they could be running with costs 25% to 50% lower than current but this is not a short term target. This is calculated as a percentage of Asset Replacement Value. Currently the responsibility for managing the maintenance budget is with James as the rolling mill maintenance manager but he is looking to share the responsibility down.

Matt the **ANSTO** representative was from the Reactor section and the plant has only recently been commissioned. The current maintenance budget was developed at a high level with no detailed cost history available for the new plant. Their current budget for 07/08 financial year

was not formally approved. Matt has been thrown into the deep end with budgeting and suggested some formal training on budgeting would be very useful.

Peter was the representative **from Tomago Aluminium**, which is owned by three different companies. There is a strong focus on generating high profits and \$ per tonne. Their budgets run calendar year. There was a 5% maintenance overspend last year that was made worse by not being announced till November. Historically they have had a culture of 'Spend the Budget'. Peter mentioned the typical management view of maintenance that 'they always put in FAT' and their tendency to want to cut 5% to 10% out of any proposed maintenance budget without any well thought-out justification. Tomago does not budget down at the equipment level yet but Peter believes that this is necessary as maintenance spend makes a lot more sense when put into the context of front line equipment. Equipment level budgeting is not easy as Tomago has over 2000 major equipment items. He also suggested that there needs to be better communication and teamwork between operations, maintenance and finance. Maintenance budgets should be an integrated part of a businesses strategy coming from Corporate Vision, Business Plans, Plant process area Strategies down to detailed area equipment strategies.

Glenn the representative from **Hunter Valley Operations (HVO)** coal mine started as a tradesman and now has obtained a commerce degree. Glen runs and very detailed ZBB (Zero Base Budgeting) system for the mobile fleet haul trucks, bulldozers and draglines for the open cut mine (biggest in the Hunter region). In the mobile equipment field the OEM supply detailed equipment maintenance plans down at major component level and gives recommended lives for each. This information is converted into a detailed budget plan. Glenn uses the Xeras software budgeting tool as well as Excel spreadsheets. Information is downloaded from Ellipse, their CMMS. The analysis of this information is not always easy as a work order of 'Engine running hot' could be linked to an expensive engine change. The analysis ends up with a risk assessment of each component. Labour quantity and local rates are put into the model and any overflow from available local hours is put onto a contractor rate.

Andrew was the representative from **Delta Electricity**. Delta have a Top Down Bottom Up approach to maintenance budgeting. Top down comes from constrains of working in the power generation industry and their great need to achieve target levels of \$/MWhr. Bottom up comes from the level of detail included by their spreadsheets down to significant equipment level. Andrew also uses a Risk Assessment process that includes estimating risks of not doing maintenance work. This analysis is performed using three sets of spreadsheets.

- Spreadsheets for the desired ideal budget (do the things you think need to be done)
- Spreadsheets representing last years budget
- Spreadsheets of the best budget to meet all management targets

Analysing the difference between these three budgets is the basis of quantifying the risk of not doing specific maintenance tasks to ensure the best outcome for the business. Andrew thought that communication between maintenance and local finance sections is important so that each can understand the goals and constraints of the other. One interesting approach to managing budget blowouts is the way Delta handle major plant failures. When one occurs they quickly make estimates of its cost and get a specific budget approval for the cost, which stops pressure going onto the existing maintenance budget. Being a semi government body Delta has lots of procedures and processes around financial issues.

The representatives from **Caltex** were Kynan and Jason. Jason is an accountant working in their engineering organisation helping them manage their financial issues. Caltex is in a competitive industry with lots of pressure from low cost Asian refineries. Over the last 10 years maintenance spending has been constrained and there is now pressure to do a range of larger jobs and carry out improvement initiatives. As there is strong competition between these initiatives and a 6x6 risk ranking system is being used to gain approval. Historically there has not been a strong formal process around maintenance budgets as opposed to the CAPEX budget where the process is rigid. Currently their maintenance costs are made up of a baseline of routine and reactive maintenance of 35% to 40% and the rest larger cost such as larger costs such as shutdowns and major repairs. The new Caltex CEO has a maintenance background and is receptive to maintenance improvement initiatives.

The representative from **Hunter Water** was Greg whose operating environment is similar to that of Sydney Water. Hunter Water do not have any formal processes around maintenance budgeting and the responsibility of the budget rests with the Maintenance manager. As with Sydney water there is a significant number of upgrades and additions, which tend to be capitalised.

Financial Budgeting Process and Timeline

There was discussion on the desirability of budgeting into the future. HVO do budgets out to four years out. Tomago has a 5 year plan.

Managing Budget Achievement

Caltex has a monthly review process to help manage budget achievement progress. They use SAP Business Warehouse software to generate review information. One problem with Maintenance budgets is that not everything that is planned to be done is actually done. Maintenance Groups do not always do what they say they are going to do for a wide range of good and poor reasons.

Cost Cutting

There was general agreement that when maintenance costs are arbitrarily cut to a level that poor long term maintenance decisions have to be made, then there will eventually be a negative business effect. The costs saved by these types of cost cutting are short term. The suggestions from the group was that there is generally a lag time of between 2 to 4 year till the negative reliability and cost consequence from the poor decisions start to strongly impact on the business.

Life Cycle Costing

Life Cycle Costing (LCC) is an approach that supports making equipment investment, operating and maintenance decisions in a way that makes the best long term sense for a business. Glenn from HVO had the most experience with this approach and had a spreadsheet model that allows LCC calculations with projections up to 30year out. He had used this model to calculate NPV of specific projects. Delta Electricity was also using a LCC approach to their investments.

Definition NPV (Net Present Value) - The present value of an investment's future net cash flows minus the initial investment. If positive, the investment should be made (unless an even

better investment exists), otherwise it should not. NPV is an indicator of how much value an investment or project adds to the value of a business.

Other Issues

Peter from Tomago discussed the setting up of cost elements. They have attempted to better integrate financial cost grouping with asset codes. The suggestion that budgeting for groups like shift crews budgets are best done from labour levels and history of costs. Sydney Water operates with a maintenance cost of around 2% of asset replacement value.

Maintenance Strategy, Budgets and Risk

There is need to relate business performance to maintenance spend. This requires a maintenance strategy that minimises business risk.

There was general agreement in the group that maintenance budgets should be strongly linked to equipment maintenance strategies. The ideal is that a download of information from a CMMS should allow automatic generation of initial budget estimates. HVO and Delta Electricity were closest to this but they still had to do a lot of work manipulating CMMS data into budgeting information.

Managing Risk Rather than Cost

James from OneSteel talked about the risk analysis process he used when he was working for Alcoa. This involved looking at downtime cost, effects of poor OEE and business impacts and how this should influence maintenance decisions.

Ownership of Budgets

It was typical amongst the group that the responsibility/accountability for achieving the budget is with the Maintenance Manager level. Both the representatives from OneSteel and Tomago had a direction of sharing the responsibility down to lower levels in the maintenance hierarchy. The suggestion was that the people most involved with spending the money should have some responsibility for cost control and budget achievement.

The comment was made that SAP has some functionality the allow authority levels for spending and can bring up alarms if the authority levels are exceeded.

Cost Reduction Processes

Peter from Tomago suggested that the 80 20 rule does not always work for maintenance cost reductions. The critical few higher cost maintenance items are typically closely reviewed and well managed anyway. The real challenge for maintenance costs are the large number of small and medium size jobs.

There are lots of pressures on maintenance cost from lots of different areas. Tradesman will typically always want to do a good job but where this costs a bit more, there are often pressure from management for working faster and not spending so much money. One area where cost reduction pressure shows up is with the routine Servicing and Inspections, which are often missed or minimised when under time or cost pressure. This ends up with negative long term results of increased unpredicted failure. The comment was made that maintenance

managers/ supervisors should protect maintenance tradesmen from any corporate cost cutting focus to ensure they have the right focus on good reliability/ maintenance practice, as this will produce the best long term cost result. The comment was made that there is usually not enough positive feedback to tradesman who are doing good work maintaining reliability, as opposed to people who fix breakdowns quickly.

Other comments were made about production pressure of wanting to get their job done now and getting equipment back into service quickly rather than doing repairs that will be in the best long term interest for the business. The suggestion was that Production/ Operations need to be educated on the discipline required for scheduling work and maintenance need to fully understand the pressure that are affecting operations.

Training for Maintenance Budgeting

It was suggested that there is a strong need to educate people about costs, cost control, budgeting, finance and generating business cases.

Ideal Budgeting Process

At the end of the meeting the group discussed what an ideal maintenance budget would look like. The unanimous opinion of the group was that budgets should be driven from maintenance strategies that are developed into detailed and costed maintenance plans. The maintenance strategies should be driven top down from the requirements of current operational and business plans and know business risks. The maintenance strategies should be driven bottom up by actual equipment reliability and cost performance for equipment and processes.

Operations and senior management should take a more detailed interest in maintenance strategies and projects so that the budgeting process is more a signoff on issues already agreed on rather than the worst case confrontational process of ambit claim and unjustified cuts. There should be a strong corporate culture that discourages short term cost minimizing strategies that are not good for the business long term.

Costs should be collected against work orders and linked to equipment and financial cost categories. Detailed costs should be able to be queried at a detailed level and rolled up to higher levels including operational process level for budgeting and analysis. Detailed information on labour costs should be available. Detailed BOM's/ APL's (Bill of Materials/ Application Parts Lists) should be developed with latest material cost for materials and components so jobs can be estimated accurately.

There should be a well defined hierarchy of accountability for management of costs down to the lowest practical level so that all those that have an influence on cost and reliability performance understand the businesses requirements. For real sustainable costs reductions to be achieved people at the front line that control the details need to do things differently/ better. Involvement at this level is also required so that costs are allocated correctly eg to the right work order etc. A realistic budget should always be set and the aim for all should be to come in under budget, not on budget. If a repair job can be safely delayed it should be delayed, as

long as it can be done in a planned manner. There should be a strong focus on planning and actually ‘doing what you said you are going to do’.

All systems around maintenance cost and budgets should be transparent and understood by all those involved and affected. There should be training on an organizations financial, cost and budgeting systems available for maintenance personnel.

There should be a strong focus on maintenance defect elimination and monitoring of leading indicators for maintenance costs such as lubrication cleanliness, vibration velocity levels for rotating equipment, PM & CM completion rates and the background level of minor defect rates.

Maintenance Budget Components

A Maintenance Budget could be made up out of four of components (including some of the author’s opinions).

1 - Maintenance Strategy Component

A core component should be driven from equipment maintenance strategies. Significant equipment items should have detailed well defined equipment strategies with estimated yearly costs and long term % reduction targets. This information should be stored in CMMS/ Strategy Software and should be able to generate this component of the yearly maintenance budget in at least a semi automated process. Costs have to be able to be tracked to the significant equipment item level to be able to review budget to actual. The types of costs included in each significant equipment strategy budget would be:

- Routine costs from PM’s, Condition Monitoring and repairs that are either planned or have a high certainty of being carried out.
- Repairs and other maintenance cost that are not certain to occur but can be given a % likelihood of occurring. Known high consequence but unlikely failure/ problems where the cost if they occurred could not be reasonably expected to be absorbed in a lean budget, should not be included (see Risk Component).

2 - Major Projects Component

Larger maintenance tasks should be managed as a separate project and should have separate budgets. These are tasks that would benefit from formal project management processes. If a project is costed for within the strategy component of the budget then the costs should be extracted into the project component. Projects might be individually justified to management and have budgets that run across financial year end points.

3 - Baseline Historical Component

Costs that are not covered within the strategy or project components should make up the baseline Component. This should include overhead costs and background levels of PM’s, repairs and labour costs. This budget should be created statistically with adjustments of historical trends, known labour and material rate changes etc. It is expected that the greater the maturity of the strategy component of the budget the lower the Baseline component would be. It is expected that there should always be some baseline component.

4 - Risk Component

Most maintenance organisations have the potential of large maintenance costs from unexpected and unlikely events eg major failure, fires, floods etc. When they occur they put

great strains on the achievement of maintenance budgets. Sometimes these costs can be statistically predicted and a risk management strategy put in place but sometimes they are completely unexpected. Costs from these types of events should be costed statistically from internal and external historical information. They can be either budgeted for or a separate budget applied for when an event occurs.

Appendix 1

**Maintenance Budgeting Presentations by
Sydney Water's John McKeon and Mahen
Mahendrarvarman**

Presentation by Sydney Water's John McKeon

Budget Proposal

- A work plan for the coordination of resources and expenditures
- Focus for today is on the budget process used by Sydney Water for its Mechanical / Electrical (M/E) assets
- There are two separate procedures for the creation of the total budget plan for M/E assets, maintenance budget and capital budget.
- Operational budget preparations are managed separately.

Budget Streams

- Maintenance budget
- Covers the day to day expenditures for planned and unplanned work on all mech/ elec assets
- Capital budget renewals/replacement
- Covers the major periodic maintenance (MPM) costs due in the budget year, and any renewals identified from the maintenance and operations

Budget Process

- The following information sources are used to draft the initial budgets
- Historical data (captured in the MMIS)
- Current budget Vs actual expenditure
- Known changes made in the asset base
- Carry over work from previous year
- Submitted business cases for MPM and renewals

Budget Timeline

- The budget timeline is reverse engineered from the date set by corporate finance for entry of this information into the finance stream.
- For SWC, April is when finance submit the budgets to the board for approval, and hence they require the operating budget by March.

Operational Budget Review Process

In December, the draft budget is sent to the stakeholders for review and comment, by the end of January an initial budget is submitted to divisional finance.

Stakeholders are:-

- Operations.
- Internal maintenance.
- Contract management.
- Divisional finance.

Operations Budget Review

- Operations review the initial budget with regards to the following factors.
- Does the budget reflect past expenditure on their responsible area.

- Have assets due to be commissioned or decommissioned in the year been allowed for in the draft budget.
- Is the agreed maintenance strategy properly costed in the budget e.g. Delayed or deferred preventative maintenance may mean a larger unplanned maintenance cost.

Internal Maintenance Budget Review

- Does the draft budget cover the current labour resources within the division or are changes required.
- Does the draft budget cover the current material and subcontractors resources in comparison to the 3 year average or are changes required.

Internal Maintenance Budget Review

- Have new assets or changes to maintenance strategy been identified and costed.
- Has the budget been seasonally adjusted to allow for different expenditure during the year.
- Ensure overheads covered by fixed management fee.
- Compare labour utilisation rate to total budgeted hours.

Contract Management Budget Review

- Contract management review the budget with regards to its appropriateness to corporate financial policy.
- The internal budget is also reviewed with regards to various corporate policies on employment utilisation and audit.
- The external budget is reviewed with regards to the signed contract provisions and the delivery of service by the external contractor.

Divisional Finance Review

- As you know finance usually start with taking a percentage off the top and see who screams the loudest, (the accountants budget review)!
- The total budget is reviewed with regards to the corporate operating/capital budget imposed by IPART.
- This is further complicated by political imperatives to meet other government initiatives.

Capital Budget Review

- Senior management review all business cases and risk rank them according to the following criteria:-
- Effect on operating process
- Effect on environment
- Effect on OH&S
- Return on investment

Service Delivery Review

- Both internal and external service providers review this budget with regards to resources for delivery of the projects.
- Checks are run on budget estimates and a more refined estimate is then derived following review of each project.

- Final packaging of the projects then forms the final draft budget figure for the capital budget.
Operational Budget for External Service Provider

Presentation by Sydney Water's Mahen Mahendrarvarman

Maintenance Budget for External Contactors

Procurement Stage

- Information provided to contractors
 - Asset list and technical data
 - Maintenance history (up to 5 years)
 - Preventive maintenance program
 - SW estimate of labour hours by work type
 - Actual materials cost for last two years
 - Special conditions (eg:Apprentices use 1 to 4)

Contractors Bid

- Labour hours by work type
- Standard labour rate
- Materials cost estimate
- Specialist contractor cost estimate
- Plant & equipment cost estimate
- Annual management fee

Budget for the following year

- Factors considered
 - Asset additions and deletions
 - Facilities additions and deletions
 - Maintenance program changes
 - Actual hours and cost from previous years performance.

Labour hours

- Contract budget hours based on:
 - Average of actual hrs and budgeted hrs
 - Deleted assets (hrs), deleted PM hrs
 - Efficiency savings of 1.5 %
 - New assets (hrs), new PM hrs

New Budget

- Labour cost estimate based on adjusted hours
- Materials, Spec.sub.contractors and Plant & Equipment cost estimates based on average and adjusted due to changes.
- Annual management fee based on required labour hours.

Budgets for Project Work

Budget for Major Project Work

- Capital Expenditure (CAPEX)
 - Asset Renewals
 - Reliability Renewals
- Operating Expenditure (OPEX)
 - Major Periodic Maintenance (MPM)
 - Operational Projects