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EASTWOODHARRIS



PRACTICAL APPLICATION OF EARNED VALUE PERFORMANCE MEASUREMENT

EASTWOOD HARRIS PTY LTD.


Welcome to the Eastwood Harris
Practical Application of Earned Value Performance Measurement
1 day training course



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IMPORTANT POINTS FOR INSTRUCTOR

- See notes below.




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Administration

- Emergency Evacuation
- Timetable
- Catering
- Mobile Phones
- Emails
- Conduct of course.

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Introductions

- Your name,
- Current position,
- Projects you are currently working on,
- Experience in project planning, scheduling and control,
- Experience in Earned Value
- Your expectations from this course.

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Required Background Knowledge

Ideally a person attending this course will have experience in:

- Project Management
- Schedule Control Systems
- Accounting / Cost Management
- Cost management of projects.

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Course Aim

To demonstrate:

- The principles of Earned Value Performance Measurement,
- How projects benefit from an Earned Value Performance Measurement System (EVPMS),
- An overview of some current standards,
- Practical advice in creating, running and reporting from an EVPMS system.

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Course Presentation

- The course uses:
 - PowerPoint presentation,
 - Questions and discussion and
 - Student workshops,
- The course focuses on "AS 4817 – 2006 Project performance measurement using Earned Value" and
- Covers other elements of EVPMS.

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Course Material

The following materials are included:

- Student workbook and
- AS 4817 – 2006 Project performance measurement using Earned Value.

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Course Contents

1. Introduction and Overview of EVPMS
2. Comparing committed cost management and EVPMS systems
3. Standards and other supporting Literature
4. Setting up an EVPMS system as outlined in AS4817
5. How EVPMS is applied to projects
6. Creating and setting the Performance Measurement Baseline
7. Measuring progress and calculating the Earned Value
8. Recording Actuals
9. Calculating the Estimate to Complete and Earned Schedule
10. Reporting and software tools
11. Scope changes, resetting the baseline, hints and tips.

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TOPIC 1 - INTRODUCTION AND OVERVIEW OF EVPMS

- History of EVPMS
- Definition of Earned Value Management (EVM)
- What is Earned Value Performance Measurement (EVPMS)?
- Benefits of Using EVPMS
- Planned Value
- Earned Value
- Actual Costs
- Comparing Budget, Actual and Earned Value
- Generating the Estimate To Complete
- Comparing Budget and Estimate At Completion
- Typical Reports
- Definitions.

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TOPIC 2 - COMPARING COMMITTED COST MANAGEMENT AND EVPM SYSTEMS

- Committed Cost Management (CCM) basics,
- Schedule Management under a CCM system,
- Advantages and disadvantages of Committed Cost Management and an Earned Value system,
- Elements of a CCM that may be used for EVPM,
- Additional data required to establish an EVPM system.

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Committed Cost Management (CCM) Basics

- Companies with a procurement and contract management system may easily provide some of the basic information required to produce a CCM cost report,
- Committed Cost Management is suitable when a project is being run with one or more contracts,
- An estimate is created as the basis for the Budget,
- Allowances are added to allow for wet weather and other unforeseen events,
- The Budget is normally set based on the estimate plus allowances and contingency,
- As Contracts and Purchase Orders are awarded, the value of the order plus an allowance for changes replaces the estimate value in the Budget to provide a revised forecast.

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Committed Cost Management of Purchase Orders and Contracts

Work Packages may consist of one or more Purchase Orders or Contracts and record the following information:

- Budgeted Value for each PO or contract,
- Committed Cost – the actual value of the PO or contract,
- An allowance for changes; this accommodates small changes without an immediate change in Project Forecast,
- Delivered value of work or delivered materials,
- Quality Checked value of work or delivered materials,
- Accruals made at the end of each reporting period,
- Value of paid invoices,
- Value of unpaid invoices,
- Unpaid Commitments on POs and contracts,
- Retention and or back charges.

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Forecast of Costs in a Committed Cost Management System

- The Project Forecast is composed of the total of:
 - The value of the Awarded Work under PO or contracts including allowances for changes,
 - The value of work completed by day labour (employees) and time and material contracts which do not have a fixed value,
 - The value of work that has not been awarded as a PO or contract and has not been undertaken by day labour,
 - Changes in Budget due to project changes, and
 - Unused allowances or contingency,
- NOTE:** Adjustments may be made to the value of unawarded work based on any relevant productivity.

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Committed Cost Management Discussion

- The value of completed work on lump sum contracts, delivered equipment, quality checked installations, invoices paid etc. is not required to calculate the Final Forecast of Costs in a Committed Cost system,
- Accounting standards typically require that accruals are made at the end of each month which would equal:
 - The value if invoiced work that has not been paid,
 - Plus the value of complete but un-invoiced work,
- These do not need to be known to calculate the Final Forecast of Costs, but are usually reported for completeness,
- A typical CCMS is on the next slide.

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Typical CCM Report

	ORIGINAL BUDGET OB	TOTAL EXPENDITURE TE	CONTRACT COMMIT CC	PAYMENT CP	OUTSTAND COMMITMENT OC = CC - CP	UNAWARDED WORK LW	FORECAST TE+OC+LW	FORECAST VARIANCE OB - FC
FORECAST	\$183,816,575	\$123,613,842	\$76,228,224	\$46,692,431	\$24,857,346	\$35,158,167	\$182,829,315	\$181,260
HAULAGE SHAFT UPGRADE	\$24,200,000	\$22,175,670	\$182,965	\$25,000	\$157,965	\$22,600	\$22,366,236	\$1,843,764
VENTILATION SHAFT	\$11,000,000	\$14,234,298	\$2,939,513	\$2,680,121	\$279,392	\$1,060,000	\$15,573,690	(\$4,573,690)
INTERIM 50 Hz POWER	\$980,000	\$601,630	\$180,925	\$130,925	\$50,000	\$120,000	\$771,630	\$208,363
INTERIM VENTILATION	\$1,338,000	\$470,245	\$0	\$0	\$0	\$824,720	\$1,294,965	\$43,035
ORE & MULLOCK HANDLING	\$7,633,014	\$5,534,484	\$3,136,871	\$564,317	\$1,943,018	\$0	\$7,477,502	\$156,512
SERVICE DECLINE	\$23,900,000	\$15,331,489	\$12,077,121	\$13,563,366	\$389,381	\$670,569	\$16,391,439	\$7,508,561
VENTILATION SHAFT	\$26,059,561	\$21,423,942	\$17,152,938	\$13,074,432	\$4,081,794	\$1,376,000	\$26,881,736	(\$822,175)
15 LEVEL	\$0	\$3,291,068	\$2,213,142	\$3,182,368	\$0	\$0	\$3,291,068	(\$3,291,068)
DEVELOPMENT	\$18,700,000	\$4,976,696	\$11,516,792	\$2,418,421	\$200,548	\$13,537,079	\$18,714,323	(\$14,323)
CONCENTRATE DEWATERING	\$4,400,000	\$4,339,326	\$4,027,827	\$4,027,827	\$0	\$0	\$4,339,326	\$60,674
MINE DEWATERING	\$14,000,000	\$2,990,523	\$6,204,707	\$2,833,543	\$3,478,989	\$7,530,508	\$14,000,000	\$0
REFRIGERATION	\$4,300,000	\$1,153,465	\$2,997,071	\$946,746	\$2,103,158	\$1,043,377	\$4,300,000	(\$0)
MINE FILL SYSTEM UPGRADE	\$7,900,000	\$1,202,722	\$569,792	\$823,899	\$384,662	\$6,332,616	\$7,900,000	\$0
CONCENTRATOR GRINDING	\$14,400,000	\$1,056,668	\$10,769,440	\$596,035	\$10,746,493	\$2,596,839	\$14,400,000	\$0

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ANSI/EIA-748-A-1998 Earned Value Management Systems

- ANSI Standard 748-A guidelines are purposely high levelled and goal orientated,
- It is intended to state the qualities and operational considerations of an integrated management system using earned value analysis method without mandating detail system characteristics,
- This standard is aimed at a higher level than AS4817 and it provides guidance on how to set up an EVM system for use at programme and enterprises level,

continued...

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ANSI/EIA-748-A-1998 Earned Value Management Systems - continued

- It may be used to ensure that all the requirements of an EVPM system are included in a corporate system and is more focused at the governance aspects of a system than the practical processes,
- Thus users of this standard would have to source the formulae and reporting methods from outside this standard,
- It is not intended to provide practical guidance in the calculation or presentation of the reporting data but covers areas such as System Documentation and Systems Evaluation not covered by AS4817,
- It also covers the Budgeting process in more detail than AS4817 including discussing various packages and mentioning accounting considerations.

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PMI Practice Standard for Earned Value Management

- The PMI Practice Standard for EVM is designed to provide readers who are familiar with the *PMBOK® Guide* with a fundamental understanding of the principles of EVM and its role in facilitating effective project management,
- This standard covers very similar topics as AS4817 but is more descriptive and less prescriptive than AS4817:
 - It has a 10 step process which is similar to the AS4817 11 step process,
 - It introduces more management concepts than AS4817 and demonstrates how Earned Value is used in the *PMBOK® Guide* Process Groups and Knowledge Areas,
 - It includes more guidance on measuring progress than AS 4817,

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PMI Practice Standard for Earned Value Management - continued

- It introduces the concept of an Estimate At Completion (EAC) late in the Standard,
- The EAC is not considered a "Basic Element" of EVM and not mentioned in either Chapters 1 or 2 and does not illustrate the EAC on any S-Curve,
- NOTE:** The forecasting of the EAC in AS4817 is considered a Benefit of EVPM and introduced in AS 4817 Chapter 1 - Introduction,
- It has less information than AS4817 about reporting charts and their interpretation,
- It is less prescriptive and for example does not include a list of requirements which are included for each Step in AS4817 and therefore the validation of a system would be more easily made against AS4817 than the PMI Practice Standard for EVM.

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Earned Value Management: APM Guidelines

- This is a very good document that covers some of the basics of earned value,
- It also explores the following topics not found in other books:
 - RAM, Responsibility Assignment Matrix,
 - The hierarchical levels of schedules and covering Cost Accounts, Planning Packages and Work Packages,
 - The hierarchical levels of Budgets and covering Margin, Management Reserve and Undistributed Budget,
 - It explains Level of Effort activities, Apportioned effort and re-baselining,
 - Demonstrates the 32 EV steps from the ANSI EVM Criteria.

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Earned Value Project Management – Quentin W. Fleming and Joel M. Koppelman.

This book takes you to the next level in Earned Value by:

- Providing the background and history of EV,
- Including many practical diagrams and examples,
- It supports and expands on the PMI standards, including the PMI 10 step process,
- It also demonstrates the 32 EV steps from the ANSI EVM Criteria.

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9. Analyse project performance data

- Schedule Variance is calculated by comparing the EV and PV,
- Cost Variance is calculated by comparing the EV and AC,
- Progress of activities is compared to the Baseline to establish slippages,
- A revised schedule and revised Estimate To Complete are calculated in order to compute the completion cost variances.

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10. Take Management Action

- Management must take action when there are variances by:
 - Developing corrective plans when there are projected deviations from the baseline,
 - Ensuring changes are not made to historical data, and
 - Follow up action must take place to ensure the corrective action plans are followed.

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11. Maintain the Baseline

- Baseline changes must be tracked and recorded,
- All changes must be traceable,
- Retrospective changes to the scope and schedule must not be made.

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TOPIC 4 – STEPS FOR SETTING UP AN EVPM SYSTEM UNDER AS 4817 SUMMARY

In this section we discussed:

- AS 4817 is used by many companies in Australia,
- This Standard outlines the key elements of an EVPMs,
- It provides parameters that may be used to determine if an EVPMs has been implemented,
- May be used to assist in the implementation of an EVPM system in any industry and all sizes of projects,
- Communicates the benefits of the EVPM method,
- It is intended to be aligned with other Australian and International Standards,
- It may be used by all project personnel and senior managers to manage projects.

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Workshop 4 – Creating the Performance Measurement Baseline in your organisation

- Select a project you are currently working on,
- Consider each of the steps below,
- Write a statement that describes how close your project team is going to be able to meet each of these requirements:
 1. Decompose the project scope
 2. Assign responsibility
 3. Schedule the work
 4. Develop the time-phase budget
 5. Assign objective measures of performance
 6. Set the Performance Measurement Baseline.

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TOPIC 5 - HOW EVPM IS APPLIED TO PROJECTS

In this section we will discuss:

- What parameters may be used to set the Performance Measurement Baseline and display Earned Value, Actual Costs and Estimate to Complete,
- At what schedule level this may be accomplished,
- Some of the difficulties that will be encountered in evaluating performance.

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Late Levelled Curves

- The Late Levelled Curve is the Latest that activities may take place without delaying the end date of a project when acknowledging schedule relationships and resource availability,
- Activities are moved to an earlier date when resources are not available.

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Where to set the baseline

- Lets discuss the envelope, or "Banana", and where you would set baseline,
- The disadvantage of most commercial software is that it does not allow the setting of the Performance Measurement Baseline (PMB) in the middle of the Early Levelled and Late Levelled, the "Banana".

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Baseline Setting Guidelines

- Standards do not provide any guidance as to how the Performance Measurement Baseline should be set in relation to Early and Late Dates,
- If the Early Dates are used, then the project will normally always be behind,
- Some options are:
 - Display the "Banana" as the Performance Measurement Baseline,
 - Set a line half way between the Early Levelled and Late Levelled line.
- The issue here is that most commercial scheduling software does not have the ability to display other options other than Early and Late Unlevelled and Levelled.

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Critical Chain Scheduling

- Critical Chain scheduling is based on a book published 1997, by Dr. Eliyahu Goldratt,
- It introduced a new approach to project management with the publication of his business novel, Critical Chain,
- In summary all work is scheduled As Late As Possible with a "Buffer" task at the end of each chain to allow for delays,
- This process creates another opportunity for the establishment of a more realistic Performance Measurement Baseline.

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TOPIC 6 - CREATING AND SETTING THE PERFORMANCE MEASUREMENT BASELINE SUMMARY

In this module we discussed the issues of setting a PMB:

- Early Curve
- Early Levelled
- Late Curve
- Late Levelled Curve
- Where to set the baseline
- Guidelines.

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Workshop 6 – Discussion

In your groups discuss your project:

- What are your options for setting the PMB?
- What is your preferred option?

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Specialised EVPMS Software

- Deltek COBRA
<http://www.deltek.com/products/cobra/>
- EVEngine
<http://www.suptec.net/>
- Primavera Earned Value Management
<http://www.oracle.com/us/products/applications/042376.htm>
- Decision Edge Earned Value Manager
<http://intqconcepts.com/>
- Oracle Primavera Earned Value Reporter
<http://www.oracle.com/>

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TOPIC 10 - REPORTING AND SOFTWARE TOOLS SUMMARY

This section covered:

- Types of EV Reports
- Current planning and scheduling software
- Specialised EV software.

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Workshop 10 – Discussion

In your groups discuss and present the following:

- What tools you would use to complete EVPM on your project?
- What reports would you present?

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TOPIC 11 – SETTING UP A SYSTEM, SCOPE CHANGES, RESETTING THE BASELINE

- Prerequisites for setting up a system
- Guidelines for setting up a system for the first time
- Managing Changes and Resetting the Baseline.

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Setting Up a System

- For a system to succeed:
 - You must have senior management support,
 - Buy in from all major stakeholders, e.g. Cost Account Mangers is required,
 - The decision to use EVPM on a project must be made early,
 - People with experience in EV should be engaged,
 - Robust systems must be designed and tested.

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SETTING UP A SYSTEM FOR THE FIRST TIME

- Start planning your policies, processes, procedures and system design early,
- Consider using the 0-100% as the start point for your EV system, by using schedule Milestones for each WBS. This has the advantage of not requiring progress to be measured,
- Consider not using all curves, Planned and Earned alone provide significant information,
- Start with a small project using project level or phase level curves only.

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Managing Changes and Resetting the Baseline

- Most standards provide guidance as how to change a Budget but not how to change the Performance Measurement Baseline in scheduling software,
- They state that changes must be:
 - Authorised,
 - Traceable back to the original baseline,
 - Not made for over spending, and
 - Not made to completed work.
- These directives will allow for setting a new Budget, but not for how to edit the schedule to create a new Performance Measurement Baseline.

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Hints & Tips

- Need – EVPM is expensive, ensure there is a need before you embark on setting up a system,
- People:
 - Read all the material you can find,
 - Gain senior management support and authority,
 - Start planning the EVPM System early in a project lifecycle,
 - Engage and educate all stakeholders,
- Process:
 - Design a proper WBS and use it,
 - Create a proper estimate and set the Budget,
 - Create a proper Schedule and baseline it,
 - Assign responsibility and control by Control Account,
 - Use good Project Management Practices.

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TOPIC 11 – SETTING UP A SYSTEM, SCOPE CHANGES, RESETTING THE BASELINE SUMMARY

In this section we discussed:

- Prerequisites for setting up a system
- Guidelines for setting up a system for the first time
- Managing Changes and Resetting the Baseline.

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Questions?

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The End

Thank you for attending.

Please complete and hand the course review sheets.