

## Sizing Work Packages

A couple of months ago I published an article on *Earned value management: 6 things people don't get*<sup>1</sup>. This stirred up quite a lot of discussion and set me to thinking exactly what makes earned value management (EVM) work on normal projects. My conclusions pick up two of the key points in '6 things' paper, in particular:

1. EVM is not a pretty 'S-Curve' chart, in fact a chart like this does not exist in ISO 21508:2018<sup>2</sup>. The project time slippage and estimated cost curve cannot be calculated from standard EVM data<sup>3</sup>. The chart may be a useful presentation tool, but it is too general for use managing the project.
2. EVM is not a scheduling process and cannot be run out of scheduling software.



The core element at the center of an EVM management system is the work packages. To make effective use of work packages, it is important to understand the concept of a work packages is not the same as a schedule activity (or even a summary schedule activity). The design of schedule activities is focused on short, sharp work-items that can be finished quickly, and while the activity is in progress, the time through to the start of the succeeding activity can be accurately assessed. The recommendation in most authorities is that most activities should be around one update cycle in duration, and do not exceed two update cycles. At its core, the purpose of the schedule is to plan and manage the efficient utilization of scarce resources.

Work packages are very different, they represent a performance management point. Managing performance means there is a manager with sufficient authority appointed to the work package (or the overarching control account) to make decisions and manage the work contained in the work package. For the manager to be able to make informed decisions, effective information on the performance of the work in the work package is required. the primary purpose of EVM is to provide this information to the manager.

To achieve this, some of the key requirements to consider when designing work packages include:

- Making each work package big enough to have a manager appointed who will have sufficient authority to direct and manage the work. The work package design also needs to be cognizant of the different managers skills and areas of responsibility; each work package should be the responsibility of a single manager.
- The work package needs to be open long enough for the EVM reporting to make a difference. This means there is enough time to receive a variance report after an update, decide on appropriate actions, implement the actions and see at a later report if the actions were successful.

<sup>1</sup> Download *Earned value management: 6 things people don't get* from: [https://mosaicprojects.com.au/Mag\\_Articles/AA011\\_EVM\\_Things\\_people\\_dont\\_get.pdf](https://mosaicprojects.com.au/Mag_Articles/AA011_EVM_Things_people_dont_get.pdf)

<sup>2</sup> ISO 21508:2018 Earned value management in project and programme management

<sup>3</sup> Earned schedule will calculate a finish date, but not the curve profile.

## EVM - Six things' people don't get!

Consequently, a typical work package needs to be sized to span 3 or 4 update cycles at least (which is diametrically opposite to schedule activity durations that need to be less than 2 update cycles).

- The work package needs to align with subcontract and trade items in the project cost system to make obtaining cost data relatively straightforward. An accrual process (pencil book) will still be needed for costs not recorded in the accounts as at month end, but the WBS and work packages need to be designed to avoid unnecessarily complex splitting of costs from a single line item, between different packages of a similar work type, that are in progress at the same time.
- The work package should also be represented by a summary activity in the schedule, with many activities under the work package, but the information derived from the schedule is quite different to the information derived from EVM; the two sets of information are complimentary, and both are needed for a complete picture.

The focus of EVM standards and books is mainly on major projects (\$1 Billion plus), with a strong bias towards defense projects. EVM was invented by the USA DoD, and defense projects world-wide are the primary users of the full suite of EVM capabilities and specialist EVM software tools.

However, to make effective use of EVM on a normal project does not need all of the 'bells and whistles' associated with EVM used on multi-\$ billion defense projects, or even all of those contained in ISO 21508. A simpler, robust and pragmatic process can gain much of the benefit for minimal effort.

### What does this look like in practice?

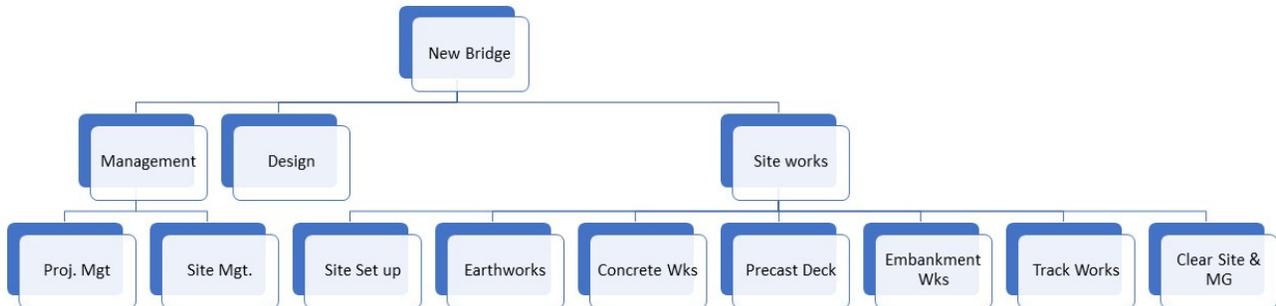


The WBS and work packages below are based on a generic, and relatively simple new railway bridge, budget cost \$15 million with a 10-month timeframe – maybe something similar to the picture above but bigger.

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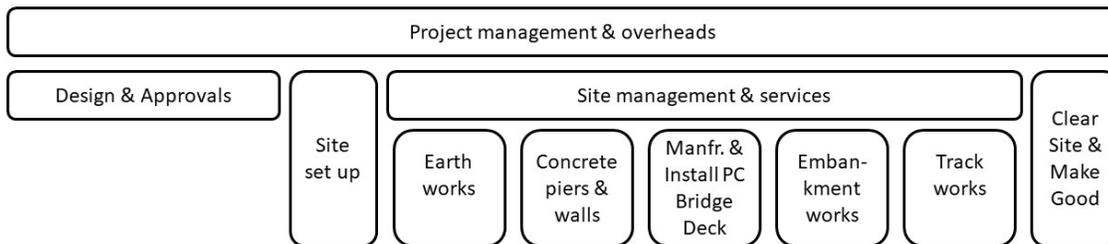
Taking the pragmatic approach recommended in this paper, the WBS could look something like this:

### New Rail Bridge – WBS



From the WBS, the general arrangement of the work packages in a block diagram would be:

### New Rail Bridge – Work Packages



The various work packages would vary between around \$300,000 to \$4,000,000. The key element in this approach is grouping similar works into the one work package (aligned with the major subcontractors) and making the direct transfer of costs from the project accounts into the work package as simple as possible.

The budget for the project ready for the application of EVM would then look something like this<sup>4</sup>:

The ten work packages are of a sensible size, they are likely to align with both a typical management structure and the project cost system, and are capable of being rigorously assessed and controlled using standard EVM metrics. The next layer of detail is in the schedule and the project accounts, there is no value in duplicating this detail in an EVM system.

mosaic		Easy EVM Workbook		
Sample Rail Bridge EVM				
WP #	WP Description	Baseline Values		
		Start	End	\$ Budget
<b>Project totals =</b>		<b>15-Nov-21</b>	<b>15-Sep-22</b>	<b>\$15,000,000.00</b>
1.1	Project management and overheads	15-Nov-21	15-Sep-22	\$850,000.00
1.2	Site management and services	02-Jan-22	15-Sep-22	\$600,000.00
2	Design & Approvals	15-Nov-21	31-Jan-22	\$1,550,000.00
3.1	Site set up	02-Jan-22	31-Jan-22	\$300,000.00
3.2	Earth works	20-Jan-22	20-Mar-22	\$1,500,000.00
3.3	Manfr. & Install PC Bridge Deck	02-Jan-22	25-Jul-22	\$3,900,000.00
3.4	Concrete piers & walls	01-Mar-22	30-May-22	\$2,900,000.00
3.5	Embankment works	30-May-22	10-Jul-22	\$1,200,000.00
3.6	Track works	26-Jul-22	30-Aug-22	\$1,700,000.00
3.7	Clear Site & Make Good	30-Aug-22	15-Sep-22	\$500,000.00

<sup>4</sup> This information can also be transcribed into an **Earned Schedule** worksheet to forecast completion: <https://mosaicprojects.com.au/PMKI-SCH-040.php#Process2>.



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### Conclusion

The message in my two books, *Easy EVM* and *Easy CPM* is that good project controls are robust, simple and provide management with information they can action. The *Easy EVM Workbook* is a simple spreadsheet built to support this philosophy. For more on these resources see: [https://mosaicprojects.com.au/shop-Easy\\_e-Books.php](https://mosaicprojects.com.au/shop-Easy_e-Books.php).

Almost anyone can create a controls system that is complicated and ineffective; there are many examples. Building a project controls system that is simple, robust and effective is more challenging but has two primary advantages:

1. The costs and time associated with developing and running the system are much lower, reports can be created in days rather than weeks, and
2. The information created is clear, concise, and verifiable, people cannot hide behind the complexities in a big fluffy system.

Applying the ideas outlined in this paper will help bring the rigour of EVM into the pragmatic realm needed to be useful managing 'normal' project.

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