Introduction to Project Management (PM101)
Section 9 – Project Performance

Workbook
Project Performance
Project Performance

*Remember, over budget, late, technical successes are not considered successful projects!*
Project Performance

What Causes Project Delays?

› Unfocused project management.

› A focus on task management.

› Dependencies between steps causes delays to accumulate and advances to be wasted.

› Parkinson’s Law.
Project Performance
What Causes Project Delays?

- The "safety" in projects is misplaced.
- Student Syndrome.
- Lack of performance metrics.
- Multi-tasking.
Multi-tasking is one of the biggest killers of project schedules and the biggest killer of lead time.

This is especially true when you must do multiple projects.
Project Performance
Multi-Tasking

- In the real world, the three managers wanting the three steps all want them at the same time.
- Look at what that does for delivery times:

```
A B C A B C
▌ 20 Days ▌ 20 Days ▌ 20 Days
```

Project Performance

What Behavior Do You Want?

- What is the real goal?

- Do your measures reflect the goal?

- What behavior do your measures entice?
Project Performance
The Keys to Success

- Always measure progress on the Critical Path as the primary means of reporting.

- Subjective measurements should be avoided:
  - They lead to false reports of completeness
  - They often make team members feel negative
  - They fail to provide guidance on future performance
  - They hinder learning from past performance
Project Performance
Measuring Success

- Dollar Days
- Gate / Milestone Targets
- Earned Value
Project Performance

<table>
<thead>
<tr>
<th></th>
<th>1st Qtr</th>
<th>2nd Qtr</th>
<th>3rd Qtr</th>
<th>4th Qtr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Costs</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>25</td>
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<tr>
<td>Budget</td>
<td>25</td>
<td>25</td>
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<td>25</td>
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</tbody>
</table>
A Single Scale
For All Three Legs
Project Performance

Introduction to Earned Value

- Earned Value provides an objective method to measure the performance of a project.

- It focuses on three (3) key variables:
  - How much has been spent?
  - How much has been accomplished?
  - How long did it take to obtain these results?
Project Performance
Introduction to Earned Value

- Earned Value can accurately measure final performance with only 10%-15% of the project completed.
- Earned Value focuses on future predictability using historical trends.
Project Performance

Earned Value Requirements

- A discrete scope of work, typically expressed with work packages.
- A time-frame to complete each work package must exist.
- Authorized project resources & budget.
- Project team members must accurately report their time and cost status.
Project Performance
Earned Value Requirements

- Earned Value projects must have tasks, activities or milestones with vertical traceability.
- There must be established relationships between all dependent tasks.
- Project performance is measured at the very bottom of the WBS.
Project Performance

Earned Value – Key Terms

- **Earned Value** – (EV) The value of work performed expressed in terms of the approved budget assigned to that work for a schedule activity or WBS component. Also referred to as the Budgeted Cost of Work Performed (BCWP).

- **Planned Value** – (PV) The authorized budget assigned to the scheduled work to be accomplished for a scheduled activity or WBS component. Also referred to as the Budgeted Cost of Work Scheduled (BCWS).

- **Actual Cost** – (AC) Total costs actually incurred and recorded in accomplishing work performed during a given time period for a scheduled activity or WBS component. Also referred to as the Actual Cost of Work Performed (ACWP).
Project Performance

In Alphabetical Order

Actual Costs  Earned Value  Planned Value

\[ CV = \text{Minus} SV \]

\[ CPI = \text{Divided By} \text{ SPI} \]

- Actual Costs
- Earned Value
- Planned Value

CV

CPI

SV

SPI

- Minus

- Divided By
### Project Performance

#### Cost Analysis

<table>
<thead>
<tr>
<th>IF</th>
<th>Actual Cost &gt; Earned Value</th>
<th>Actual Costs = Earned Value</th>
<th>Actual Costs &lt; Earned Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Then</td>
<td>CV &lt; 0</td>
<td>CV = 0</td>
<td>CV &gt; 0</td>
</tr>
<tr>
<td></td>
<td>CPI &lt; 1</td>
<td>CPI = 1</td>
<td>CPI &gt; 1</td>
</tr>
<tr>
<td>The project is</td>
<td>Over Budget</td>
<td>On Budget</td>
<td>Under Budget</td>
</tr>
</tbody>
</table>

The project is **Over Budget** if the actual cost is greater than the earned value. If the actual costs equal the earned value, the project is **On Budget**. If the actual costs are less than the earned value, the project is **Under Budget**.

CV: Cost Variance

CPI: Cost Performance Index

IF: If

Then: Then
## Project Performance

### Schedule Analysis

<table>
<thead>
<tr>
<th>IF</th>
<th>Planned Value &gt; Earned Value</th>
<th>Planned Value = Earned Value</th>
<th>Planned Value &lt; Earned Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Then</td>
<td>SV &lt; 0</td>
<td>SV = 0</td>
<td>SV &gt; 0</td>
</tr>
<tr>
<td></td>
<td>SPI &lt; 1</td>
<td>SPI = 1</td>
<td>SPI &gt; 1</td>
</tr>
<tr>
<td>The project is</td>
<td>Behind Schedule</td>
<td>On Schedule</td>
<td>Ahead of Schedule</td>
</tr>
</tbody>
</table>

*The project is behind schedule if Planned Value > Earned Value.*

---

*Looking Glass Development, LLC.*
Project Performance

Forecasting – ETC

- ETC based on new estimate
  - ETC = BAC - EV

- ETC based on atypical variances
  - ETC = (BAC - EV) / CPI

- ETC based on typical variances
  - ETC = (BAC - EV) / CPI

- ETC based on both the CPI & SPI
  - ETC = (BAC - EV) / CPI * SPI

BAC = Budget at Completion
BAC - EV = Remaining Work
VAC = Variance at Completion
Project Performance

Forecasting – EAC

- Using a new estimate
  - EAC = AC + ETC
- Using remaining budget
  - EAC = AC + (BAC – EV)
- Using CPI
  - EAC = AC + ((BAC – EV)/CPI)
- Using both CPI & SPI
  - EAC = AC + ((BAC – EV)/(CPI*SPI))
Forecasting – TCPI

The calculated projection of cost performance that must be achieved on the remaining work to meet a specified management goal.

Using BAC

\[ TCPI = \frac{BAC - EV}{BAC - AC} \]

Using EAC

\[ TCPI = \frac{BAC - EV}{EAC - AC} \]

\[ VAC = BAC - EAC \]
Project Performance

<table>
<thead>
<tr>
<th></th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
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<td>Actual Costs</td>
<td>8</td>
<td>13</td>
<td>15</td>
<td>15</td>
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<tr>
<td>Planned Value</td>
<td>10</td>
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<td>15</td>
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<tr>
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<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>12</td>
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Project Performance

Key Metrics YTD

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<thead>
<tr>
<th>Measure</th>
<th>Measure to Target</th>
<th>Actual</th>
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<tr>
<td>Revenue</td>
<td>$2,388,377</td>
<td>$638,052</td>
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<tr>
<td>Profit</td>
<td>550</td>
<td>93%</td>
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<tr>
<td>Avg. Order Size</td>
<td>357</td>
<td>4.2</td>
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<tr>
<td>On Time Delivery</td>
<td>19%</td>
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<td>New Customers</td>
<td></td>
<td></td>
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<tr>
<td>Customer Satisfaction</td>
<td></td>
<td></td>
</tr>
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<td>Market Share</td>
<td></td>
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<tr>
<td>Budget</td>
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<tr>
<td>Results</td>
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Costs  Budget  Results
Project Performance
The Results

<table>
<thead>
<tr>
<th></th>
<th>Estimated</th>
<th>Actual</th>
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<tr>
<td><strong>Budget</strong></td>
<td>100</td>
<td>Min: 125</td>
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<tr>
<td></td>
<td></td>
<td>Max: 156</td>
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<td><strong>Schedule</strong></td>
<td>4 Qtrs.</td>
<td>5 Qtrs.</td>
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Project Performance
Conclusions

- Overruns do not correct themselves over time.
- In fact, they tend to get worse.
Questions and Answers
Review Questions:

1. Which of the following is a major cause of project delays?
   A. A lack of performance standards
   B. Poorly trained project managers
   C. The student syndrome
   D. Bad resources

2. Which of the following is NOT a major cause of project delays?
   A. A lack of performance standards
   B. The student syndrome
   C. Misplaced safety
   D. None of these

3. Which of the following is critical to performance reporting success?
   A. Selecting subjective reporting measures
   B. Measuring progress using the critical path
   C. Sending out weekly status reports
   D. Using a collaboration tool for reporting

4. Which of the following is not tracked in earned value?
   A. Are the right deliverables being done?
   B. How much has been spent?
   C. How much has been accomplished?
   D. How long did it take to achieve the results?

5. Earned value purports to be able to accurately predict final project performance with only how much of the project completed?
   A. 15%-20%
   B. 10%-15%
   C. 20%-25%
   D. 25%-30%

6. Which of the following is NOT required to use the earned value method?
   A. A WBS
   B. A schedule for each work package
   C. Accurate resource time reporting
   D. Completed project Use Cases
7. Which of the following terms represents the value of work performed expressed in terms of the approved budget assigned to that work for a schedule activity or WBS component?
   A. Planned Value
   B. Earned Value
   C. Actual Costs
   D. Budgeted Cost of Work Completed

8. Which of the following terms represents the authorized budget assigned to the scheduled work to be accomplished for a scheduled activity or WBS component?
   A. Earned Value
   B. Actual Costs
   C. Planned Value
   D. Budgeted Cost of Work Completed

9. Which of the following terms represents the total costs actually incurred and recorded in accomplishing work performed during a given time period for a scheduled activity or WBS component?
   A. Actual Costs
   B. Planned Value
   C. Earned Value
   D. Budgeted Cost of Work Completed

10. If the project has completed $6 worth of work, had $10 in expenses, and planned on spending $7, what is the project's cost variance?
    A. -1
    B. 0.6
    C. -4
    D. .86

11. If the project has completed $6 worth of work, had $10 in expenses, and planned on spending $7, what is the project's cost performance index?
    A. -4
    B. -1
    C. .86
    D. 0.6
12. If the project has completed $6 worth of work, had $10 in expenses, and planned on spending $7, what is the project's schedule variance?
   A. -4
   B. 0.6
   C. .86
   D. -1

13. If the project has completed $6 worth of work, had $10 in expenses, and planned on spending $7, what is the project's schedule performance index?
   A. .86
   B. -4
   C. -1
   D. 0.6
Answer Key:

1. C
   The student syndrome is just one major cause of project delays.

2. D
   All of the choices are causes of project delays.

3. B
   Always measure progress on the Critical Path as the primary means of reporting.

4. A
   The right deliverables being done is not tracked in earned value, while the other three choices are.

5. B
   Earned Value can accurately measure final performance with only 10%-15% of the project completed.

6. D
   Completed project Use Cases are not required to use the earned value method.

7. B
   Earned Value provides an objective method to measure the performance of a project.

8. C
   The Planned Value (PV) is the authorized budget assigned to the scheduled work to be accomplished for a scheduled activity or WBS component. It is also referred to as the Budgeted Cost of Work Scheduled (BCWS).

9. A
   The Actual Cost (AC) is the total costs actually incurred and recorded in accomplishing work performed during a given time period for a scheduled activity or WBS component. It is also referred to as the Actual Cost of Work Performed (ACWP).

10. C
    \[ CV = EV(6) - AC(10), \text{ so } CV = -4 \]
11. D
   CPI = EV(6) / AC(10), so CPI = 0.6

12. D
   SV = EV(6) - PV(7), so SV = -1

13. A
   SPI = EV(6) / PV(7), so SPI = .86