previous Home next

# 3.12.01 Earned Value Analysis

The Earned Value Analysis emerged in the early 60's as a control method of the U.S. Air Force and is a management tool for projects in many countries. Earned Value or Earned Value Analysis refers to a method to make the progress of a project measurable and predictable at any given time. The key figure, which with this is done by this method, is also known as Earned Value.

Earned value is based on the three basis key figures which can be calculated at any given time in the project

- **BCWS** (Budgeted Cost of Work Scheduled : scheduled - planned costs cumulated up to this point in time),
- **ACWP** (Actual Cost of Work Performed : actual - accrued expenses cumulated up to this point in time) and
- **BCWP** (Budgeted Cost of Work Performed : actual plan - cumulated planned costs for activities completed up to this point in time)

With Earned-Value-Analysis, not only the planned and actual values, but also a third value (BCWP, also stated in hours) can be used for project evaluation. This third value produces measurable project progress. The absolute differences of the project from the plan regarding the project schedule and costs are described as **Schedule Variance** = BCWP - BCWS and **Cost Variance** = BCWP - ACWP.

The chart first presents the key figures of the Earned Value Analysis in tabular form. This allows the user to select the periods as a column for the plan, actual (and remaining), the progress (degree of completion of the current period less the degree of completion of last period), the earned value and the key figures and the differences in the tab “Parameters”. The available periods are weekly, monthly and quarterly. The row structure is defined with the settings in grouping: (by employee, phase, occupation and subproject).

To determine the progress, four options can be selected: The option “progress from plan” determines for the grouping feature (see next element), the calculated degree of completion (actual effort/ planned effort), the option “progress from project” uses the degree of completion from the project and the option progress from job uses in the estimations from TimeTracker.

The data for the table can be in hours, person days or in EUR (currency).

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## Earned Value

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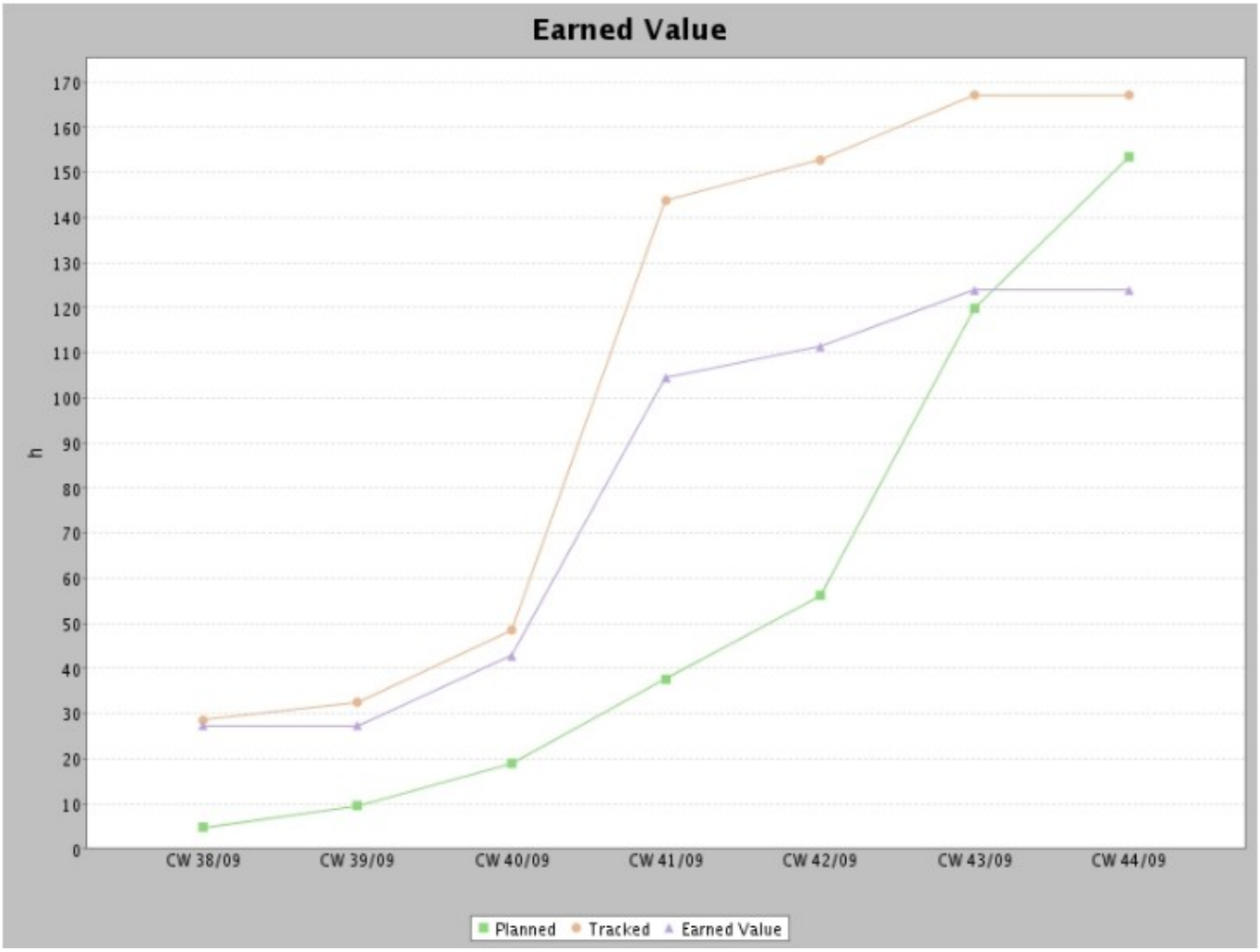
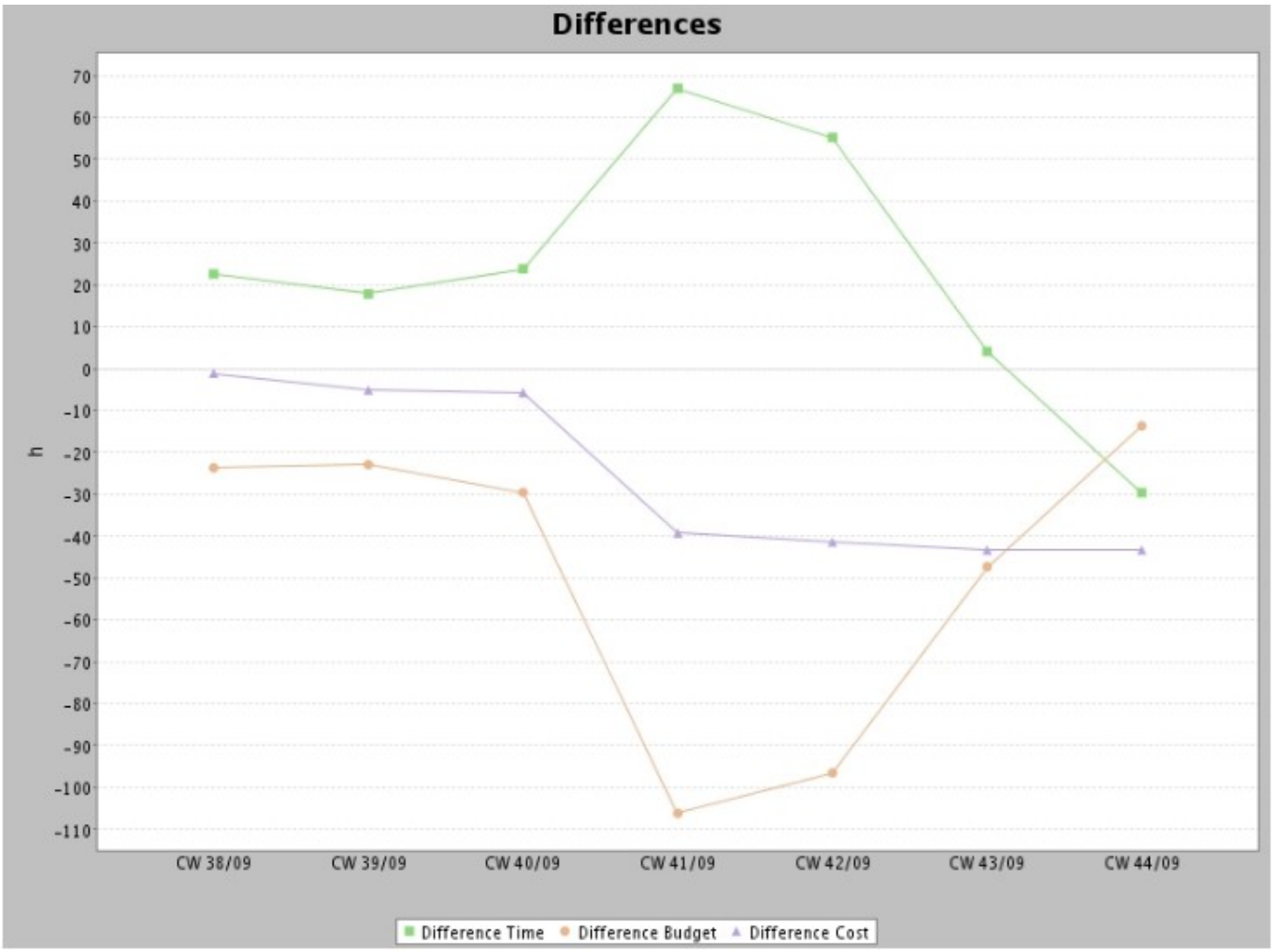
14.09.2009 - 30.10.2009

| **Planned [h]** | Part | Total | CW 38/09 | CW 39/09 | CW 40/09 | CW 41/09 | CW 42/09 | CW 43/09 | CW 44/09 |
|---|---|---|---|---|---|---|---|---|---|
| 3 Introduction Projectile | 100,00 | 219,50 | 4,78 | 4,78 | 9,37 | 18,64 | 18,64 | 63,64 | 33,64 |
| 3.1 Introduction Accounting | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 |
| 3.2 Projectplanning | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 |
| 3.3 Implementation | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 |
| Sum | 100,00 | 219,50 | 4,78 | 4,78 | 9,37 | 18,64 | 18,64 | 63,64 | 33,64 |
| | | accumulated | 4,78 | 9,57 | 18,94 | 37,58 | 56,21 | 119,85 | 153,49 |
| | | | | | | | | | |
| **Tracked [h]** | Deviation from plan | Sum | | | | | | | |
| 3 Introduction Projectile | -59,83 | 159,67 | 28,50 | 0,00 | 16,00 | 91,75 | 9,00 | 14,42 | 0,00 |
| 3.1 Introduction Accounting | 7,50 | 7,50 | 0,00 | 4,00 | 0,00 | 3,50 | 0,00 | 0,00 | 0,00 |
| 3.2 Projectplanning | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 |
| 3.3 Implementation | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 |
| Sum | -52,33 | 167,17 | 28,50 | 4,00 | 16,00 | 95,25 | 9,00 | 14,42 | 0,00 |
| | | accumulated | 28,50 | 32,50 | 48,50 | 143,75 | 152,75 | 167,17 | 167,17 |
| | | | | | | | | | |
| **Progress [%]** | State | | | | | | | | |
| 3 Introduction Projectile | in progress | 56,44 | 12,47 | 0,00 | 7,00 | 28,12 | 3,14 | 5,70 | 0,00 |
| 3.1 Introduction Accounting | in progress | 38,46 | 0,00 | 100,00 | 0,00 | 0,00 | 0,00 | -61,54 | 0,00 |
| 3.2 Projectplanning | planned | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 |
| 3.3 Implementation | planned | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 |
| | | | | | | | | | |
| **EarnedValue [h]** | State | | | | | | | | |
| 3 Introduction Projectile | in progress < Plan | 123,88 | 27,38 | 0,00 | 15,37 | 61,72 | 6,90 | 12,51 | 0,00 |
| 3.1 Introduction Accounting | in progress < Plan | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 |
| 3.2 Projectplanning | planned | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 |
| 3.3 Implementation | planned | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 |
| Sum | in progress < Plan | 123,88 | 27,38 | 0,00 | 15,37 | 61,72 | 6,90 | 12,51 | 0,00 |
| | | accumulated | 27,38 | 27,38 | 42,75 | 104,47 | 111,37 | 123,88 | 123,88 |
| | | | | | | | | | |
| **Figures [h]** | | | CW 38/09 | CW 39/09 | CW 40/09 | CW 41/09 | CW 42/09 | CW 43/09 | CW 44/09 |
| Planned | | BCWS | 4,78 | 9,57 | 18,94 | 37,58 | 56,21 | 119,85 | 153,49 |
| Tracked | | ACWP | 28,50 | 32,50 | 48,50 | 143,75 | 152,75 | 167,17 | 167,17 |
| Earned Value | | BCWP | 27,38 | 27,38 | 42,75 | 104,47 | 111,37 | 123,88 | 123,88 |
| | | | | | | | | | |
| **Differences [h]** | | | | | | | | | |
| Difference Time | | BCWP - BCWS | 22,59 | 17,81 | 23,81 | 66,89 | 55,16 | 4,03 | -29,61 |
| Difference Budget | | BCWS - ACWP | -23,72 | -22,93 | -29,56 | -106,17 | -96,54 | -47,32 | -13,68 |
| Difference Cost | | BCWP - ACWP | -1,12 | -5,12 | -5,75 | -39,28 | -41,38 | -43,29 | -43,29 |

The first graph of the chart visualizes the key figures BCWS, ACWP and BCWP. The green graph represents the cumulative planned time/effort up to this time, the orange graph represents the cumulated accrued expenses up to this time and the estimated time/effort from the current period. The purple graph represents as comparative value the cumulated planned time/effort of activities completed up to this time. Using the option “display costs” displays costs instead of effort.




The second graph of the chart visualizes the differences of time BCWP - BCWS, budget BCWS - ACWP and costs BCWP - ACWP.




The relative differences, which can also be used to compare various projects are:

- **SPI:** Schedule Performance Index = BCWP/BCWS and
- **CPI:** Cost Performance Index = BCWP/ACWP.

SPI and CPI in particular can be used to predict the project duration and/or the project end budget (EAC = Estimate at Completion).