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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

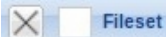
- **BCWS** (Budgeted Cost of Work Scheduled : scheduled - planned costs cumulated up to this point in time),
- **ACWP** (Actual Cost of Work Performed : actual - accrued expenses cumulated up to this point in time) and
- **BCWP** (Budgeted Cost of Work Performed : actual plan - cumulated planned costs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



Earned Value

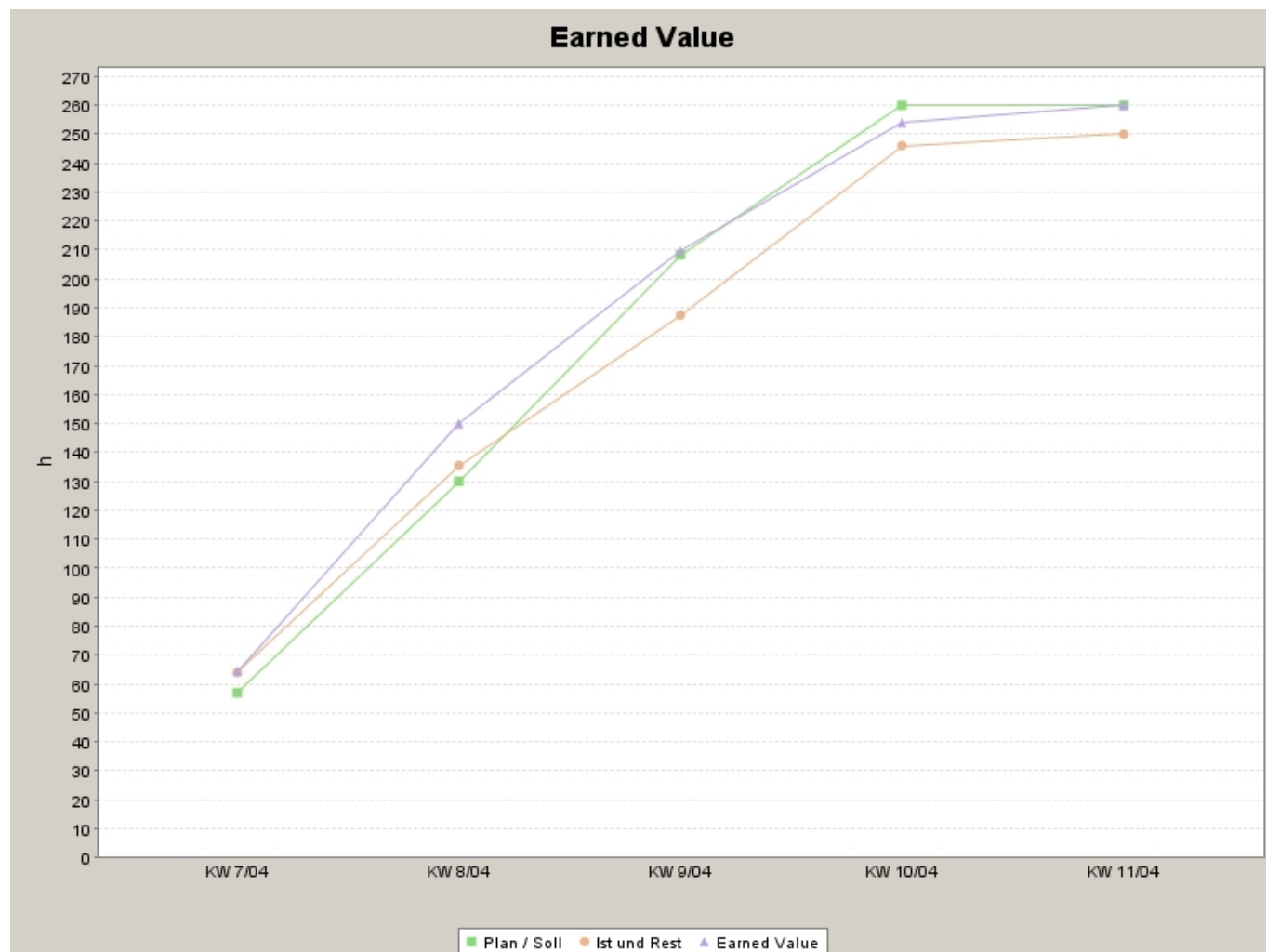
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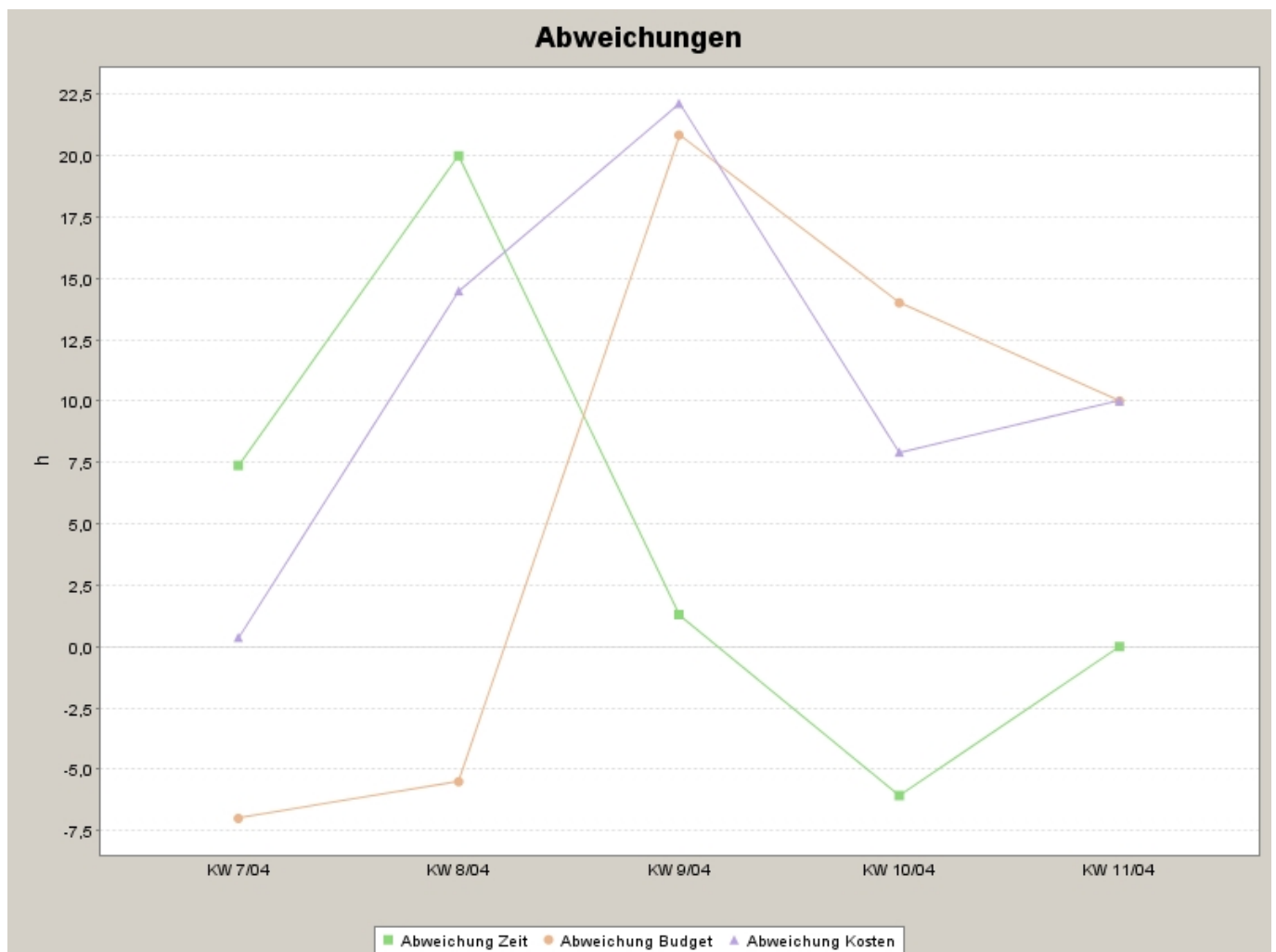
Planned [h]	Part	Total	CW 38/09	CW 39/09	CW 40/09	CW 41/09	CW 42/09	CW 43/09	CW 44/09
3 Introduction Projectile	100,00	219,50	4,78	4,78	9,37	18,64	18,64	63,64	33,64
3.1 Introduction Accounting	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
3.2 Projectplanning	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
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 expenses up to that date, the orange graph represents the cumulated accrued expenses up to this time and the estimated expenses from the current period. The purple graph represents as comparative value the cumulated planned expenses of activities completed up to this time. Using the option "display costs" displays costs instead of effort.

Die erste Graphik der Auswertung visualisiert die Kennzahlen BCWS, ACWP und BCWP. Der grüne Graph stellt die bis zu diesem Zeitpunkt kumulierten geplante Aufwände dar, der orange Graph die bis zu diesem Zeitpunkt kumulierten aufgelaufene Aufwände und ab der aktuellen Periode die geschätzten Aufwände. Der violette Graph stellt als Vergleichsgröße die kumulierten geplante Aufwände der bis zu diesem Zeitpunkt fertiggestellten Aktivitäten. Bei der Option "Kosten anzeigen" werden statt Aufwände Kosten angezeigt.



The second graph of the chart visualizes the differences 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).

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