

Activity Code vs WBS

This discussion has been going on for quite some time. I vaguely remember planning systems that did not support code structures for filtering and sub-totals. In my opinion Activity Codes were P3's Crown Jewels and the feature most responsible for Primavera's dominant position in the high-end project controls market.

WBS is not, as some in the planning community believe, an instrument of torture used by the SAP police. It is just another activity code, and since P6 has an unlimited number of them – what is so special about WBS?

One of our missions in project controls is to make good project management practice as ubiquitous as good financial management. Part of that is to have a coding structure that we agree between Planning engineers, Cost engineers, and Accountants – that is the role I envisage for WBS. When an accountant says “Design Phase” every planner should understand *exactly* which activities we are ALL talking about.

So what is special about WBS? Firstly, and perhaps most importantly, it has a name that some outside the planning community recognise. But in P6 WBS controls some arithmetic, it controls:

- How Performance per cent Complete (aka Earned Value) is calculated.
- How Estimate to Complete is calculated, e.g. does it reflect CPI

So it is not a “dumb” code – it controls certain project arithmetic, and that arithmetic can be varied within a project depending on the WBS code.

What is bad about WBS?

Consider the three projects illustrated below, where the Group and Sort is WBS:

Layout: Classic Schedule Layout		Filter: All Activities					
Activity ID	Activity Name	Original Duration	Remaining Duration	Start	Finish	Total Float	Budgeted Labor Units
[-] Project 1		5	5	05-Nov-13	11-Nov-13	0	120
[+] Design		5	5	05-Nov-13	11-Nov-13	0	40
[+] Fabricate		5	5	05-Nov-13	11-Nov-13	0	40
[+] Install		5	5	05-Nov-13	11-Nov-13	0	40
[-] Project 2		5	5	05-Nov-13	11-Nov-13	0	120
[+] Design		5	5	05-Nov-13	11-Nov-13	0	40
[+] Fabricate		5	5	05-Nov-13	11-Nov-13	0	40
[+] Install		5	5	05-Nov-13	11-Nov-13	0	40
[-] Project 3		5	5	05-Nov-13	11-Nov-13	0	120
[+] Design		5	5	05-Nov-13	11-Nov-13	0	40
[+] Fabricate		5	5	05-Nov-13	11-Nov-13	0	40
[+] Install		5	5	05-Nov-13	11-Nov-13	0	40

Each of these projects have the same WBS..... except that the route of the WBS is the Project ID:

WBS			
Projects Activities WBS Risks Re			
Layout: WBS			
WBS Code	WBS Name	Total Activities	
[-] NEWPROJ-1	Project 1	3	
[-] NEWPROJ-1.des	Design	1	
[-] NEWPROJ-1.fab	Fabricate	1	
[-] NEWPROJ-1.inst	Install	1	
[-] NEWPROJ-2	Project 2	3	
[-] NEWPROJ-2.des	Design	1	
[-] NEWPROJ-2.fab	Fabricate	1	
[-] NEWPROJ-2.inst	Install	1	
[-] NEWPROJ-3	Project 3	5	
[-] NEWPROJ-3.des	Design	1	
[-] NEWPROJ-3.fab	Fabricate	1	
[-] NEWPROJ-3.inst	Install	3	

Project Id is level 1

All other levels the same

So, even though these projects were created from the same template – We cannot use WBS to answer the question “what is the total of all design manhours”.

Consider this WBS in a little more detail:

WBS				
Projects	Activities	WBS	Risks	Resources
Layout: WBS				
WBS Code	WBS Name	Total Activities		
NEWPROJ-3	Project 3	5		
NEWPROJ-3.des	Design	1		
NEWPROJ-3.fab	Fabricate	1		
NEWPROJ-3.inst	Install	3		

Which we open up to another level:

WBS				
Projects	Activities	WBS	Risks	Resources
Layout: WBS				
WBS Code	WBS Name	Total Activities		
NEWPROJ-3	Project 3	5		
NEWPROJ-3.des	Design	1		
NEWPROJ-3.des.mech	Mechanical	0		
NEWPROJ-3.des.Elec	Electrical	0		
NEWPROJ-3.fab	Fabricate	1		
NEWPROJ-3.fab.mech	Mechanical	0		
NEWPROJ-3.fab.elec	Electrical	0		
NEWPROJ-3.inst	Install	3		
NEWPROJ-3.inst.mech	Mechanical	0		
NEWPROJ-3.inst.inst	Electrical	0		

You could characterise this WBS as level 2 is phase, level 3 is discipline.

That's fine *unless* you want to see subtotals of phase within each discipline. Using WBS you can only roll-up and roll-down through the hierarchy. In the above WBS, Discipline sub totals within Phase are automatic. Phase within Discipline is not possible.

What's good about Activity codes?

In our WBS world..... we can easily do this:

Activities

Activities | Projects

Layout: Classic Schedule Layout Filter: All Activities

Activity ID	Activity Name	Original Duration	Remaining Duration	Start	Finish	Total Float	Budgeted Labor Units	June 20				
								0	27	03	10	
Project 1		5	5	05-Nov-13	11-Nov-13	0	120					
+ Design		5	5	05-Nov-13	11-Nov-13	0	40					
+ Fabricate		5	5	05-Nov-13	11-Nov-13	0	40					
+ Install		5	5	05-Nov-13	11-Nov-13	0	40					
Project 2		5	5	05-Nov-13	11-Nov-13	0	120					
+ Design		5	5	05-Nov-13	11-Nov-13	0	40					
+ Fabricate		5	5	05-Nov-13	11-Nov-13	0	40					
+ Install		5	5	05-Nov-13	11-Nov-13	0	40					
Project 3		5	5	05-Nov-13	11-Nov-13	0	120					
- Design		5	5	05-Nov-13	11-Nov-13	0	40					
Mechanical		0	0			0	0					
+ Electrical		5	5	05-Nov-13	11-Nov-13	0	40					
- Fabricate		5	5	05-Nov-13	11-Nov-13	0	40					
+ Mechanical		5	5	05-Nov-13	11-Nov-13	0	40					
Electrical		0	0			0	0					
- Install		5	5	05-Nov-13	11-Nov-13	0	40					
+ Mechanical		5	5	05-Nov-13	11-Nov-13	0	40					
+ Electrical		5	5	05-Nov-13	11-Nov-13	0	0					

Group and Sort

Display Options

- Show Group Totals
- Show Grand Totals
- Show Summaries Only
- Shrink vertical grouping bands

Group By

Group By	Indent	To Level	Group Interval	Page Break	Font & Color
WBS level 1	<input checked="" type="checkbox"/>	All		<input type="checkbox"/>	12 Arial
WBS level 2				<input type="checkbox"/>	11 Arial
WBS level 3				<input type="checkbox"/>	9 Arial
WBS level 4				<input type="checkbox"/>	8 Arial

OK Cancel Apply Delete Sort... Default Help

Three projects open, so we have three subtotals at the project level as each project has a separate WBS structure.

But activity codes do the above layout as well:

The screenshot displays the Primavera P6 Professional R8.3 interface. The main window shows a hierarchy of activities for three projects: Project One, Project Two, and Project Three. Each project is expanded to show three activity codes: Design, Fabricate, and Install. The layout is set to 'David Phase/Discipline'. A 'Group and Sort' dialog box is open, showing the 'Display Options' section with 'Show Group Totals' checked and 'Indentation Suppressed' highlighted. The 'Group By' section shows a table with columns for Group By, Indent, To Level, Group Interval, Page Break, and Font & Color. The 'Group By Options' section has 'Name / Description' checked. A callout bubble points to the 'Collapse to' button in the activity list, stating: "Collapse to" invoked to suppress AC-Discipline. Another callout bubble points to the 'AC-Discipline' row in the 'Group By' table, stating: "EPS level Activity codes".

Group By	Indent	To Level	Group Interval	Page Break	Font & Color
Project				<input type="checkbox"/>	12 Arial
AC-Phase	<input type="checkbox"/>	All		<input type="checkbox"/>	11 Arial
AC-Discipline	<input type="checkbox"/>	All		<input type="checkbox"/>	9 Arial
					8 Arial
					8 Arial

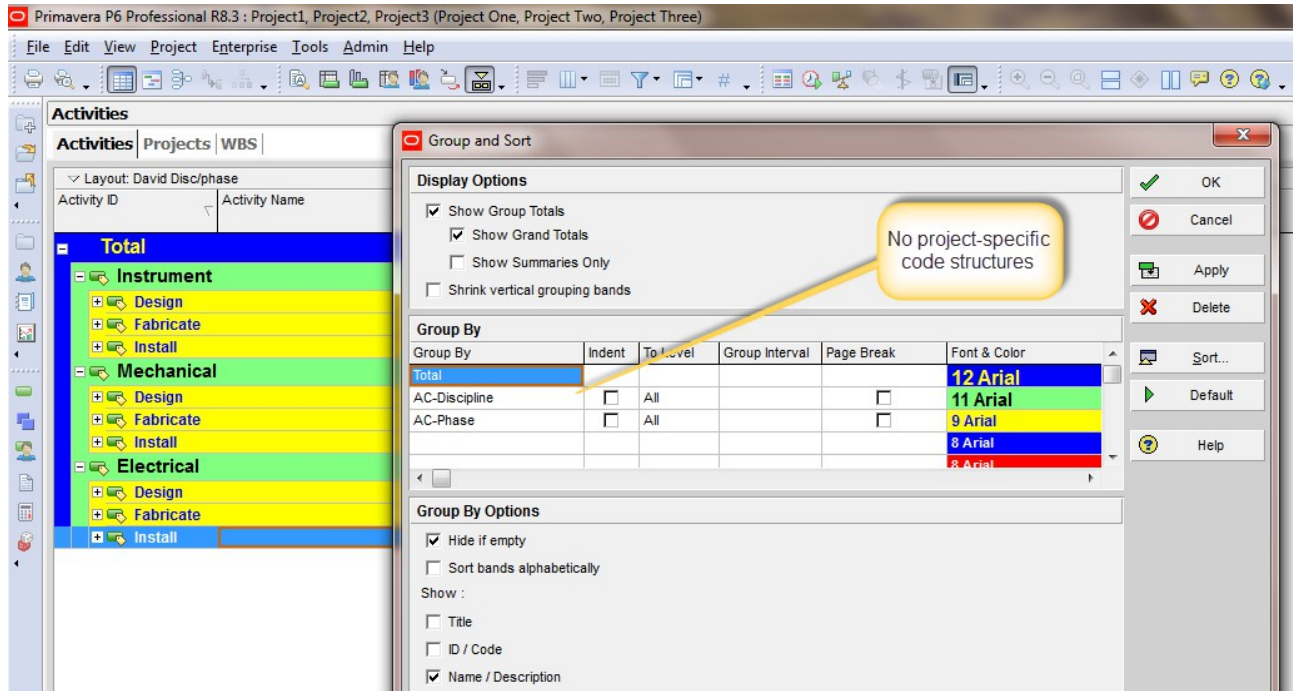
Although the indentation is suppressed in the above layout, all activity codes in P6 allow the same hierarchy as WBS, e.g. the AC-Discipline code will support Mech.fitter, Mech.welder etc.

But in the layout below, we see phase within discipline which is not possible with a WBS, because you can only group down the single hierarchy, rather than pick the order of the individual code dictionaries.

The screenshot shows the Primavera P6 Professional R8.3 interface. The main window displays a Work Breakdown Structure (WBS) for three projects: Project One, Project Two, and Project Three. Each project is broken down into three phases: Instrument, Mechanical, and Electrical. Each phase is further divided into three activities: Design, Fabricate, and Install. The WBS is color-coded: Instrument is green, Mechanical is yellow, and Electrical is blue. The 'Group and Sort' dialog box is open, showing options for displaying group totals and sorting by project, AC-Discipline, and AC-Phase. The 'Group By' table is visible, and the 'Group By Options' section is checked for 'Name / Description'.

Group By	Indent	To Level	Group Interval	Page Break	Font & Color
Project				<input type="checkbox"/>	12 Arial
AC-Discipline	<input type="checkbox"/>	All		<input type="checkbox"/>	11 Arial
AC-Phase	<input type="checkbox"/>	All		<input type="checkbox"/>	9 Arial
					8 Arial
					8 Arial

But what if we want the sum of each discipline or each phase, without reference to the project? The Activity Code Dictionaries we are using are not project specific, so:



All three projects are open in the above layout, but the activities in all of these projects are grouped and summarised without respect to the project.

Is work breakdown structure the correct place for work breakdown structure?

Almost without exception the systems which a corporation uses other than P6 that also incorporate a work breakdown structure are more likely to treat work breakdown structure as what P6 would call a global code. This is quite a surprise, we would have expected in an enterprise wide system like P6 that work breakdown structure would be global rather than project specific. It is P6 that is the "odd one out" here.

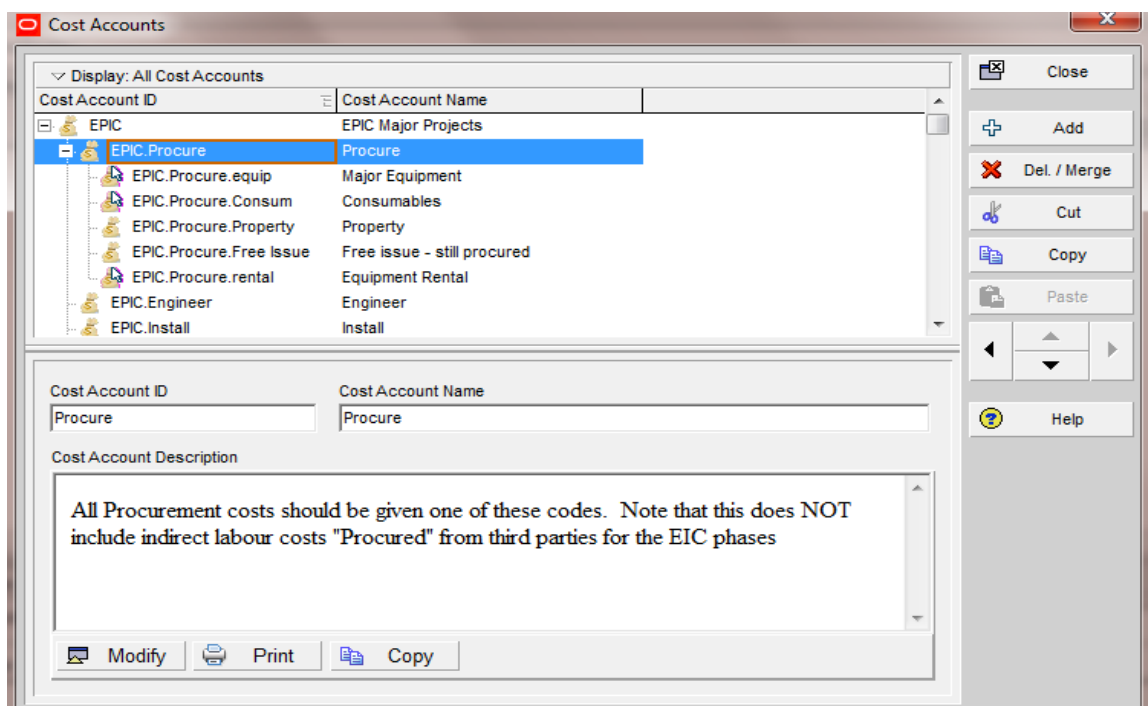
There is a code structure in P6 that perhaps is more suitable for the corporation's WBS than the project specific WBS that P6 provides – the Cost Account.

There are four sources of cost that an activity can have:

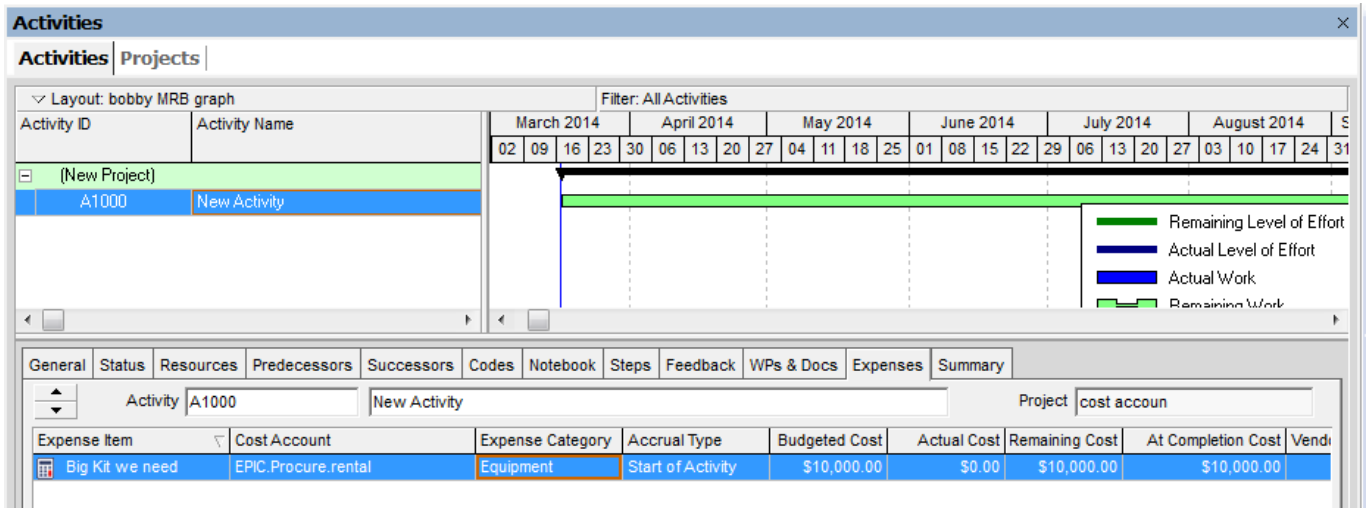
- Labour Resource
- Non Labour Resource
- Material Resource
- Expense

These are all attributes of an activity, which are of course automatically summarised through the WBS. To exhibit all four sources of cost an activity would require three resource assignment records and an expense record. Each of those four records could have a different value from the Cost Account dictionary – which is Global rather than Project specific. As with all P6 codes, it can express a 25 level hierarchy and each element of that hierarchy can be 20 characters long. An activity which can only have one WBS can therefore have as many Cost Accounts as it has Resource Assignment or Expense records.

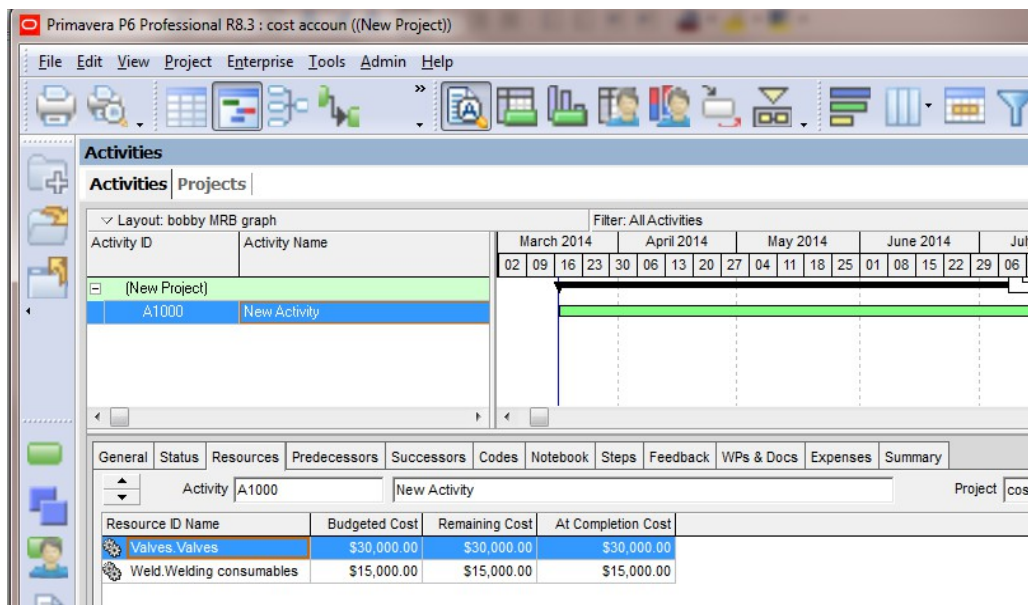
The Cost Account Dictionary is under the "Enterprise" pull down (of course)



So in one activity we could have a one off cost for equipment rental....



and a couple of resources:



All three of these "cost elements" have the same WBS because they belong to the same activity – but they have three different cost accounts.

This means I can group the activities from any number of projects by a single cost account hierarchy, OR group them by cost account within project.

A common code for WBS

There is one avenue that can be considered when data across several projects needs to be analysed using the WBS.

Consider these projects:

ProdDev Product Development 09-May-08 ProdDev				
ProdProg1 Product Program 1 30-Dec-09 ProdProg1				
PRDD00914	Project Nano	30-Jan-10		ProdProg1
PRDD00228	Xstar Release II	30-Jan-10		ProdProg1
PRDD00516	3D Prototype Project	30-Jan-10		ProdProg1
PRDD00752	Zepher Phase III	30-Jan-10		ProdProg1
PRDD00111	Magna Pad Product Test	30-Jan-10		ProdProg1
PRDD00266	Algorithm Modification Project	30-Jan-10		ProdProg1
ProdProg2 Product Program 2 30-Dec-09 ProdProg2				
PRDD00481	KRS3000 Replacement Project	30-Jan-10		ProdProg2
PRDD00499	Hemaform Program	30-Jan-10		ProdProg2
PRDD00883	Plasma Product Launch	30-Jan-10		ProdProg2
PRDD00414	4G Tablet Project	30-Jan-10		ProdProg2

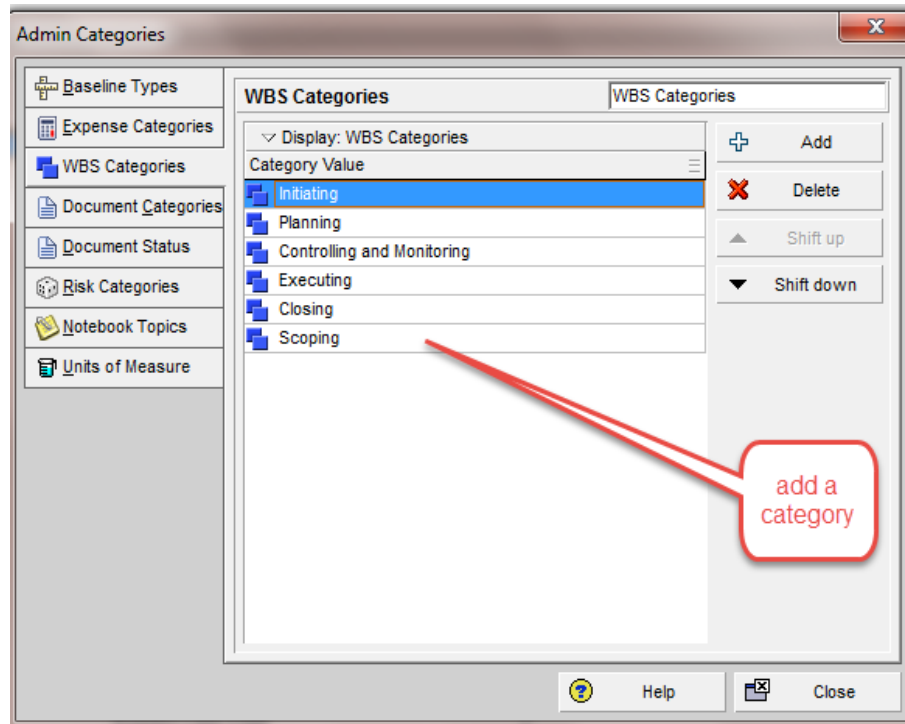
They “share” a WBS, of course since the root of the WBS is the same as the root of the project, when we examine the WBS structures of the above projects we see this:

WBS			
Activities WBS Projects			
Layout: WBS			
WBS Code	WBS Name	Total Activities	
PRDD00481	KRS3000 Replacement Project	13	
PRDD00481.1	Scoping Stage	1	
PRDD00481.2	Business Case Stage	2	
PRDD00481.3	Development Stage	2	
PRDD00481.4	Testing and Validation Stage	1	
PRDD00481.5	Launch Stage	2	
PRDD00499	Hemaform Program	13	
PRDD00499.1	Scoping Stage	1	
PRDD00499.2	Business Case Stage	2	
PRDD00499.3	Development Stage	2	
PRDD00499.4	Testing and Validation Stage	1	
PRDD00499.5	Launch Stage	2	
PRDD00883	Plasma Product Launch	13	
PRDD00883.1	Scoping Stage	1	
PRDD00883.2	Business Case Stage	2	
PRDD00883.3	Development Stage	2	
PRDD00883.4	Testing and Validation Stage	1	
PRDD00883.5	Launch Stage	2	
PRDD00414	4G Tablet Project	13	
PRDD00414.1	Scoping Stage	1	
PRDD00414.2	Business Case Stage	2	

What if we require totals for the “scoping” phase highlighted in the above screenshot?

There is a single, flat (i.e. NOT hierarchical code) that can be added to the WBS structure.

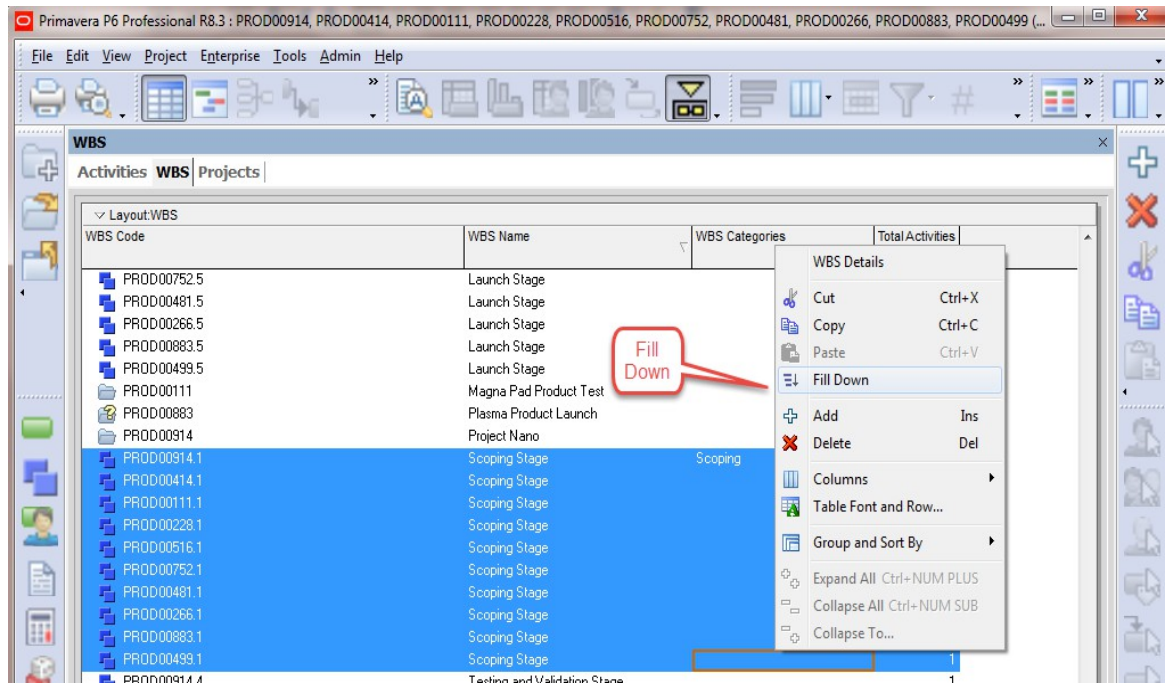
Under the Admin Categories from the main toolbar, add a new WBS category:



Add the Column "WBS Category" to the WBS screen, and sort it by WBS Name:

Layout:WBS			
WBS Code	WBS Name	WBS Categories	Total
PRD00752.5	Launch Stage		
PRD00481.5	Launch Stage		
PRD00266.5	Launch Stage		
PRD00883.5	Launch Stage		
PRD00499.5	Launch Stage		
PRD00111	Magna Pad Product Test		
PRD00883	Plasma Product Launch		
PRD00914	Project Nano		
PRD00914.1	Scoping Stage		
PRD00414.1	Scoping Stage		
PRD00111.1	Scoping Stage		
PRD00228.1	Scoping Stage		
PRD00516.1	Scoping Stage		
PRD00752.1	Scoping Stage		
PRD00481.1	Scoping Stage		
PRD00266.1	Scoping Stage		
PRD00883.1	Scoping Stage		
PRD00499.1	Scoping Stage		
PRD00914.4	Testing and Validation Stage		
PRD00914.4	Testing and Validation Stage		

Now we can "Fill down" the value we just added to the Admin Categories:



Now we can Group and Sort the Activities window by WBS Categories for multiple projects and have a single total for a WBS element:

