IPMA USA international project management association

The Breakdown Structure; Getting It Right: Concepts, Principles, Processes and Matching Vocabulary

By Simon Harris, PMP, CGEIT, Ex PRINCE2® examiner

Editor's Note: This is part 2 of a two-part analysis by Simon Harris. If you did not see part 1, we recommend that you read it first. We praise Simon's use of the phrase PMBOK® Guide. It is relatively rare for a practitioner to demonstrate deep knowledge about two diverse standards; we are fortunate to have Simon write for us. Because Simon contributes his insights from the UK, we have left his article in classic British English. To our dear readers who are a bit confused by the British spelling, welcome to the International world of Project Management! Thank you Simon!

First Concept (and subsequent concepts)

The first concept to grasp is that projects revolve around a motivated team with shared understanding of the project's scope. The second concept is that scope in the eyes of the customer is "result achieved" and in the eyes of the team is "actions taken".

We really, really do need a breakdown of the results required and a breakdown of actions (or work) to achieve the results and the two must be 100% aligned.

The first facilitates discussion with the customer and the second with the technicians. Neither excludes the other, both concepts are needed in context, both concepts need vocabulary.

Each Perspective On Scope Needs Tools & Techniques To Manipulate It

Scope has many manifestations and breakdown structures (plural) are a family of tools to deal with each perspective.

Use of the wrong tool for the conversation at hand is a mistake that encourages the wobbles that eventually cause project stress – perhaps to the point of failure.

In contrast the use of the correct tool allows us to cope with even the worst uncertainty within the definition of the project. For example the use of an activity oriented breakdown structure after results definition allows specification of the actions that will achieve the result. Gaps in knowledge or understanding will be highlighted and can then be dealt with.

Both 'result' and 'actions to achieve them' are "scope". The actions side of scope consumes 'time' and 'resources (cost)' to perform. Actions are only ever 'in scope' because of the results that are 'in scope'.

Breakdown Structure Properties and Description

When the project's customer declares they want a new production facility, stock handling system, office-move, moon-shot or 1,000 bedroom hotel the project's need is to translate this 'result scope' into the best possible resourced, scheduled and costed plan.

Plans and Investment Decisions iterate

Good plans enable the customer to assess the benefit versus cost equation and decide their intention: invest further or not. Weaker plans leave more uncertainty within the parameters of the decision.

Weaker plans result from both poorer understanding of planning concepts, principles and processes and poorer input data such as vague and incomplete capture of "What we want is…"

Poor planning should be recognised as incompetence while poor input data is a fact of competitive economies that reward right decisions made swiftly on incomplete data.

A poor plan from poor data can be invested in to improve its ability to inform the investment decisions.

Planning Steps

There are many steps in the planning process and many seasoned PMs know short cuts to arrive at the investment equation and decision as quickly as possible at a level or risk tolerable to the investors.
Sadly it appears that fewer PMs know the whole process from first principles.

At some point the problems of weak project definition stress the organisation's abilities. When only the short-cut planning approach is known then weak process creates weak solutions that later may fail. In these cases the first-principles path would lead to greater (but slower) certainty of plan. However if first principles are unknown then they will also be unavailable.

The Role of First-Principles

We will thus explore from first-principles in order that there is always a sound approach available to us that cannot be undermined by lack of insight into process.

When you are expert in both the principles and the technical aspects of the customer's problem space then first principle can with understanding of the affect be optimised (steps skipped) to create solutions adequate for decision making that are faster and cheaper. The sequence is 1) understand first principles and then 2) optimise them, not "Step 1) omit the bits we don't understand the significance of".

Concept: Customer Oriented Scope Definition

The customer (has to) defines the "What", the technician's job is to extract it

The project's result or 'destination' view of scope is a *customer oriented view of scope*. It is the expression of "**what** we are prepared to pay for".

A project starts when someone with an idea and some energy decides to combine them into the solution to a problem or the grasping of an opportunity. In the starting phase those involved need to be able to share understanding of scope from the "what" perspective.

Reality Includes the Incomplete and Unstable Definition

What we can say about the project's "what" may be fully complete, highly detailed and utterly stable or what we can say may be incomplete and subject to change. Either is reality and thus "correct".

To say a project "can only start with a clear objective" is a fairy tale world that I don't live in. [Unless you say "the initial objective is always clearly: it is to define the final objective as clearly as is possible given what we know today"].

Whatever the qualities of the initial expression of "what" (*customer oriented view of scope*) if it is to be shared, understood, defined, modeled, base-lined, changed under control and ultimately achieved then my model of choice is the breakdown structure as defined by the term PBS.

The Initial Breakdown Structure: The Final Result's Breakdown

In the initial phase of the project (phase, work-package, task or activity) our breakdown structure is of the **Final Result** [also known as the Destination, or Impact, or Outcome, or Deliverable(s) or Product(s)]. Commonly outside of PMBOK Guide circles this decomposition is called a Product Breakdown Structure. Within PMBOK circles this definition fits an interpretation of the PMBOK Guide's definition of Work Breakdown Structure.

Reality is simple: Step 1 – Define WHAT the customer wants. Say nothing about how to achieve it (unless constraints are being imposed).

A Principle of Breakdown Structures

Breakdown structures are the output from the use of the decomposition technique. Breakdown structures have two primary visual representations: rooted tree graph and indented list.

Decomposition

Decomposition is a technique which asks the "what is this composed of?" question recursively. The question has two primary dimensions in its answer:

1. Sub-product (sub-impact etc) nouns which describe or represent the voice of the customer, and
2. Sub-task (phase etc) verbs which describe or represents the work of the technician.

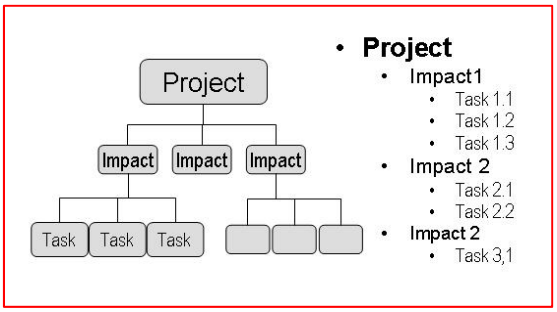


Figure 1: Two Equivalent Breakdowns

These two dimensions IE "Customer view" and "Technician view" equate to specification of "What" and "How". In a first principles approach we concentrate first on the customer. We ask the "what is this composed of?" question in a "What result is required" context.

Breakdown Structure Rules and Guidelines

The breakdown structure is a simple, placid tool with few restrictions inherent in 'good usage'. All the guidance can be bent or broken when experience makes it desirable.

1) The first guideline is, do not break or bend the guidelines: it rarely buys much advantage and (almost) always has a bigger cost latter on.
2) Second, anything that the team (genuinely) take common understanding from is right and proper.
3) Third, creation of breakdown structures is a team game played on ones feet.

The sole purpose of all project planning techniques is to use the tools to create shared understanding. Shared understanding leads to expression of disbelief. Once disbelief is expressed then goals and approaches can be refined until understanding and belief are achieved.

Involvement, understanding and belief are the three keys that unlock 'motivation'.

There are a whole host of reasons why the exploration of scope is done standing up (on one's soles). For a start standing (or rather not falling over) stimulates the part of the brain that is important to conceptualising and internalising ideas (see Peter Strick's work on the brain[i]) . Also standing directs the eyes to a shared focus on a single, common record of the information at hand. Also expression of disbelief is easier when it avoids the personal challenge between individuals that contradiction combined with eye-contact evokes.

To play the game well you should use a wall and self-adhesive-notes or a white board, or windows or flip-chart paper stuck to the wall. Self-adhesive notes are often suggested because they are easily re-locatable during the discovery stage. A white board often works just as well.

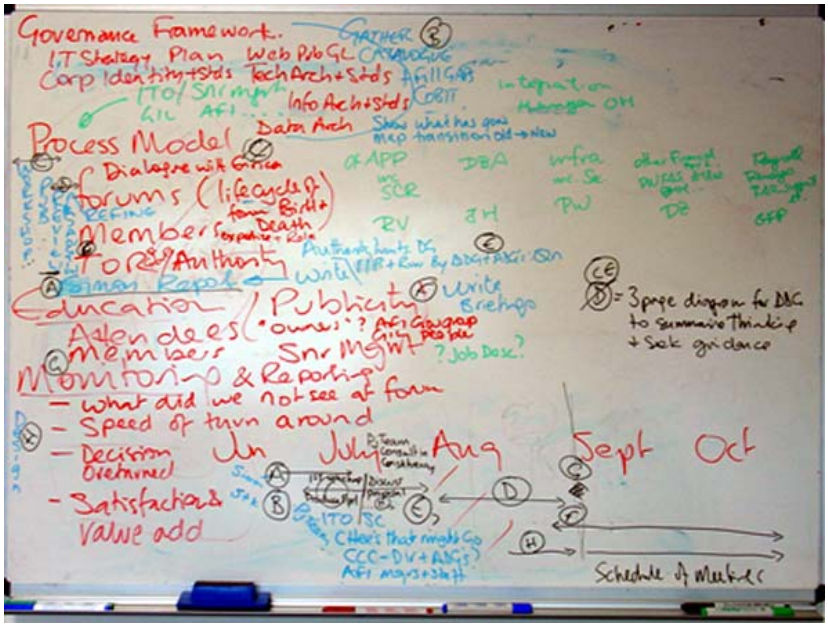


Figure 2 at right: One of the author's sessions PBS in Red, WBS in Blue (Who in Green and Dependency in Black!)

All exploration or discovery of project scope is ultimately a form of brainstorming. The breakdown structure is a means to impose order on the discovery either as the scope is expressed or afterwards when seeking to make the expression of scope manageable.

4) More prosaically, and returning to the mechanics of the tool. Every level of the breakdown is exactly 100% of the level above and a minimum of two items (In the expressions below ≡ means "identical to").

For illustration, imagine a pack of cards.
Pack_of_Playing_Cards ≡ Pack_of_Playing_Cards provides no extra information so is useless as a model that clarifies understanding.

Instead
Pack_of-Playing_Cards ≡ {Hearts + Diamonds + Spades + Clubs + Jokers + Box} is 100% correct in both directions.

If this is sufficient definition we stop decomposition; otherwise we might say:
Hearts ≡ {A♥ +2♥ +3♥ +4♥ +5♥ +6♥ +7♥ +8♥ +9♥ +10♥ +J♥ +Q♥ +K♥} and likewise for the other three suits. After that it is perhaps impossible to further decompose (say) 2♥ ≡ ?!

Although we could now describe its features as (a rectangle X by Y inches or mm with corner radius of Z, made of white cardboard of G gsm, printed on one side with any image of the team's choice and on the other with two 64pt heart shapes and the number "2" in 32pt Arial in each corner printed in the shade of red whose pantone-code is abc}.

The description of the features is the specification of acceptance criteria. Stating acceptance criteria rewrites "scope" as "quality" – Scope and quality are the same topic.

5) There is no sequence in the breakdown structure's representation of scope.
A decomposition has no ability to show sequence or ordering so do not read sequence from them.

It is inescapable that the brains of the creators will use sequence in their thinking to imagine the breakdown's contents. It is likely they will use the convention of their mother-tongue to lay-out the recorded component parts. I.e., Western teams will create breakdowns that run more or less left to right while other cultures may use right to left, top down or may through continual exposure to English be comfortable with and adapt to left to right.

When creating the breakdown we know where we followed sequence of thought with sequence of representation. When reading someone else's breakdown structures there is no syntax in the diagram to make sequence explicit so do not assume it.

6) Start with the Customer's wants and needs
Always start with the bill payer or their representatives to develop a decomposition (Product Breakdown Structure) of what they will pay for. From a supplier perspective we must decompose as far as is needed to define the conditions under which they are obliged to pay.

From the customer's perspective they must ensure the decomposition covers everything needed to achieve fitness for purpose. (Hence the step should create a Benefits Breakdown Structure but that isn't in scope of this writing).

Fitness for purpose (FFP) is the customer's responsibility – caveat emptor – but the wise PM recognises that the tool to achieve good definition (the PBS) is unlikely to be something the customer has fluent command of. The project should assist the customer to reach confidence that the PBS describes what is fit for purpose. Failure in this regard leads to argument at the end of the commission at exactly the time the supplier is deepest out of pocket.

7) Once the PBS is defined both parties must verify it.
For every product ask "is this product necessary to trigger the bill payer's obligation to pay?" and also "have we defined all the product's acceptance criteria to the level that will trigger the bill payer's obligation to pay?" A subsidiary question might also be "and do we believe we can achieve it!?"

The customer should verify for themselves "is this (sub-) product necessary to achieve fitness for purpose and are all products required for FFP included?" A subsidiary question might be "and has the supplier shown the capability to create them all?"

The answer to any of these questions may be "not sure". Under these circumstances committing to a price or delivery date is a risk for all parties. If a commitment is made then that is a political or commercial decision not a project management one. Project management activity is however the source of the information that is the basis to make the uncertainty political or commercially oriented decision.

Every item in the PBS should have a record in the Configuration Management System (CMS) that identifies that it will be created or acquired at some point in the project (and probably that currently work has not yet started).

8) After the customer has defined "what" in a PBS then ask the technical teams to define the steps in the life-cycle of the (sub-) products. (See also the discussion below under the heading "Decompose" as far as is useful, or "to the level needed for control") IE they add the development actions that create each product. These may (with luck!) be defined as Standard Operating Procedures or Method Statements in the supplier's Quality Management System and Estimating tool-set.

The decomposition technique is now recording answers to the question "how is this (sub-) product/configuration item made or acquired?" Decomposition of tasks in the product life-cycle should extend as far as is useful (guidance on 'useful' follows below).

The output of the task identification step is the Product oriented Work Breakdown Structure. As the name states the PoWBS groups by product all the work that will deliver the bill payer's specified (sub-) products. It is the project's inventory of all known activities. Note that for the lowest level results/ products/ impacts/ nouns in the PBS the verbs will reflect acquisition or construction while for higher level nouns the verbs reflect integration (and at all levels verification).

At this point we are on the threshold of moving from scope definition to development of schedule, budget, resource profile and thus project baseline.

The steps in each product's lifecycle should be recorded in the configuration management system (CMS). The CMS may only record lifecycle steps that represent hand-overs between skill groups and/ or points at which product maturity is gauged – i.e. tests are applied.

Growing product maturity may be linked to the commercial aspect of payment milestones and must be integrated with thinking about how to judge achievement for project tracking purposes. In particular the use of earned value and selection of appropriate earned value recognition schemes (EV-types) starts here and now.

At this point in planning we have a full view of scope arrived at through gentle steps whose results are easily verified and auditable.

9) Once the PBS has been extended with product lifecycles then verify it. Since the planning steps thus far have been focused on the customer's needs and wants the PoWBS is structured or grouped around (sub-) products. At this point in planning we have a full view of scope arrived at through gentle steps whose results are easily verified and auditable.

For every task in the product's life-cycle, ask "is this task necessary to deliver the (sub-) product to the customer?" and delete it if it is not required. Additional questions might be "is this the fastest/ cheapest/ best way?"

For every product ask "Are all the required tasks to deliver this product to the customer included within the PoWBS?"

10) When all the tasks to deliver all the products are identified (or at least as much as we can know) re-arrange them to suit scheduling and other planning steps.

At this point we have the project's work scope defined. The best definition that is currently possible to know. However it is not structured as I want it for the up-coming planning steps of dependency modeling, resourcing and scheduling. So it is appropriate to change the orientation to make it well matched to what we need for scheduling or budgeting or resourcing etc.

This point in the planning process is one at which software tools such as WBS*Pro may help. We will find it useful to re-draw the PoWBS as any or all of a Cost oriented Breakdown Structure, Phase oriented Breakdown Structure, Resource Allocation Breakdown Structure or Precedence network.

In truth software based help should not be required at this point as the breakdown structure should be limited to 50 items more or less (This startling revelation will be justified below).

The PMBOK Guide's RAM chart (Responsibility Assignment Matrix) is a good way to effect the reorientation. The RA-Matrix is formed by placing a list of work on one axis and people or groups on the other and marking the intersections to show their involvement. A useful extension is to label the nature of involvement; e.g., Responsible/ Accountable/ Consulted/ Informed.

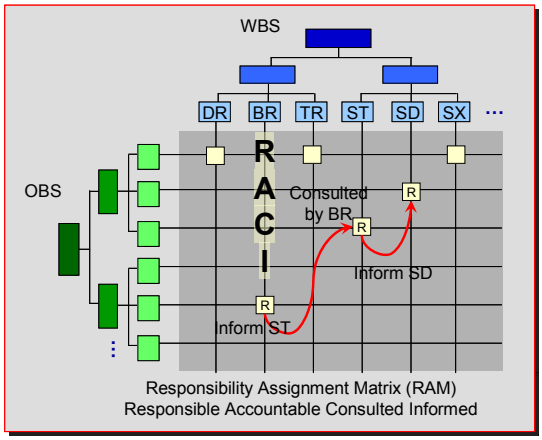


Figure 3: A RAM or RACI chart

Decompose as far as is useful, or "to the level needed for control". The acid question is "how far is that?" and the caustic answer is "it depends"!

But we can be helpful and state the dependency: it is when all parties have shared clarity of the aspects that they judge to be material to success. As we saw with the playing card example there is also a natural end-point driven by what we might call the laws of nature.

Take as an example my wife's often asked question: "What do you want for an evening meal?" There are a thousand ways this conversation could move on but let us share the following imaginary dialogue:

I reply "I'd like Venison, Vegetables and Gravy, Red wine, Sponge pudding and Custard". She might now ask "what vegetables?" as that is an ambiguous specification capable of further decomposition and one where I may have an opinion. It is more likely the vegetable choice is constrained by what is on-hand. Thus she might instead say "I'll do potatoes and carrots, how do you want the potatoes done?" We have at this point arrived at a component of the solution "potato" that admits no further product oriented breakdown in a way useful to the project objective of feeding the family.

If the potato was the object of a project researching crop disease then the decomposition:
Potato ≡ {Skin + Pulp}, pulp ≡ {Sugars + Starches +…}, Sugar ≡ {Carbon +…} may be useful.

12) Decomposition (eventually) yields acceptance criteria.
Our family feeding project has reached a natural limit of product decomposition with the potato. At this point in development of project plans we must switch thinking to the exploration of the product's acceptance criteria; so I reply "Mashed please". This acceptance criteria imposes a constraint on the process specification that is material to my satisfaction and thus 'acceptance'.

Both parties understand implicitly "served hot" and could specify "hot" in more detail if required, both parties understand an implied portion size and could specify it if required. Ditto the time of service. In a serious contract the dimensions of acceptable product and thus constraints on acceptable development process have a natural home in the sequence of the project's definitional steps.

Given my wife's culinary expertise she might also ask "what potato variety would you like" or "Which venison cut would you like?" or "which gravy or custard recipe should I follow" all of which would be met by "I don't mind, you choose" as I've no idea of the difference created in one potato variety's mash and any others! If these factors will affect my assessment of "Fit For Purpose" neither of us know it at this point.

In a serious contract context we have reached the point at which the customer's ability (or interest) to specify has been exhausted. For any lower level specification the supplier will make the decisions, perhaps after presenting options to the supplier.

To Summarise This Point's Guidelines:
1) The project's end result is successively decomposed into deliverables/ results/ impacts that can be described by the customer (perhaps prompted by the technical experts) until decomposition in the eye's of the customer is impossible (or disinteresting) and in the eyes of the technicians is unnecessary to meet the acceptance criteria.

2) Products and sub-products are recorded in the configuration management system along with details of verification activities that will be used during execution to track accomplishment.

3) Decomposition eventually arrives at deliverable artifacts or impacts whose acceptance criteria are the only factors left to be described. In establishing acceptance criteria it is likely that constraints are placed on the development process.

4) It is the customer's duty and risk that they specify Fitness For Purpose. Any gap or omission will add cost or compromise to the end result that they are obligated to fund.

5) Scope of work follows from scope of result and acceptance criteria.
The mashed potato has a life-cycle that may run something like {Plant, Grow, Harvest, Wash, Peel, Boil, Mash, Serve…} or {Buy, Boil, Mash, Serve…}. The breakdown structure facilitates discussion between relevant project participants to explore where the project's scope boundaries lie. In this case {Wash, Peel… since in this case the supplier, my wife, believes root vegetables taste better if purchased and stored dirty.

6) A breakdown structure is 7±2 items wide and 2 to 4 levels deep!
No one can comprehend even 1,000 separate tasks, thus to plan a project with 10,000 tasks in scope requires some form of organisation to be imposed to "chunk" the work.

We need three perspectives to devise an answer to how to organise the project's scope? (and when the project is 1,000,000 tasks we need other approaches not discussed here but building on the principles given here (Let me know if these approaches would be of interest to read about).
The start point then is "well, what is understandable?" The answer, for most people, dealing with a subject that they have not spent large efforts on memorising is "about 7 chunks". Each of which might reasonably be broken into about 7 chunks, each of which might… and so on (See George Miller's 1956 paper[ii]).

Another perspective is that the bottom of a WBS however oriented represents an atomic task that is delegatable to a single point of accountability via the RAM. The work-package may be a request to one of my children to "Please peel the potatoes" or it may be the "Build Saturn V rocket" contract. In both cases understanding of the result to be achieved is fully shared in acceptance terms between delegator and delegatee (or a PBS/ PoWBS should be created to clarify the delegation and acceptance criteria or both parties should explicitly acknowledge the risk exposure is acceptable).

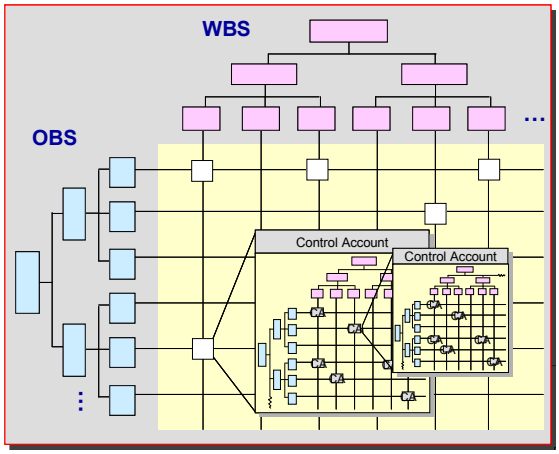


Figure 4: The bottom of my breakdown is the top of yours

When as project manager I receive a commission from my customer/ boss I seek to decompose the end result into the deliverables (impacts) that when created will discharge my obligation. I target breaking the final goal into 7±2 chunks with acceptance criteria (AC). It is possible that the AC are just an aggregate of lower level AC or there may be AC at this level as well or instead.

To be sure that we have common understanding I (or my technical staff) will work with customer/ boss to decompose each deliverable into 7±2 sub-products with acceptance criteria until they lose interest or ability to decompose. That may take 10 levels but rarely takes more than two. 7 times 7 plus one for the commission we started with is 50!

Any one person's breakdown structure should not exceed 50 items, although a single item may be the rocket used for the moon shot. (Actually 35 is a better target!)

Then I take my typically 2 level deep but possibly deeper in places **P**BS and workshop decomposition into 7±2 life-cycle steps, each of which may then benefit from being decomposed into 7±2 further steps. In theory at this point I have 1 Project, 7 major products so 49 sub-products with acceptance criteria and thus 1+7+49 times 7 lifecycle steps times 7 sub-steps or 2,793 chunks. More than enough scope definition even for the Apollo program.

Again more than I can reasonable cope with, but in reality rarely are all four levels needed or all 7 chunks needed before we either reach tasks with no meaningful decomposition (E.g. peel potatoes may decompose to "and dispose of the peelings" but there is nothing below that) or a group of tasks is delegated to a single responsible party (E.g. as in Provide The Rocket).

My Rocket sub-contractor will recursively apply the same principles that I have applied to delegate out work-packages to their technicians and sub-contractors. Thus I have one item "Delivered Rocket" and they have 7 major sub-products etc.

Even a large project will allow me to target circa 35-50 chunks for overview and perhaps a few hundred in total divided on an area by area basis for extra detail.

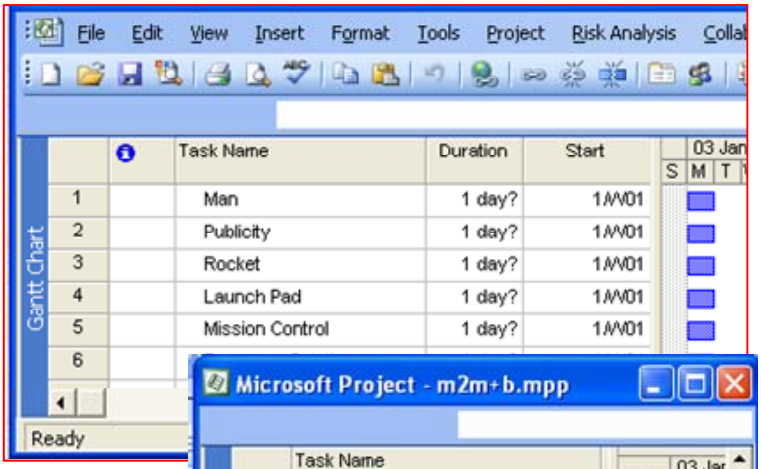
Man to the Moon and Back Safely

We have the benefit of hindsight to discuss this project, but imagine the various levels of planning workshop.

Initial Planning

The initial outcome-centred planning session identifies the following products or impacts:

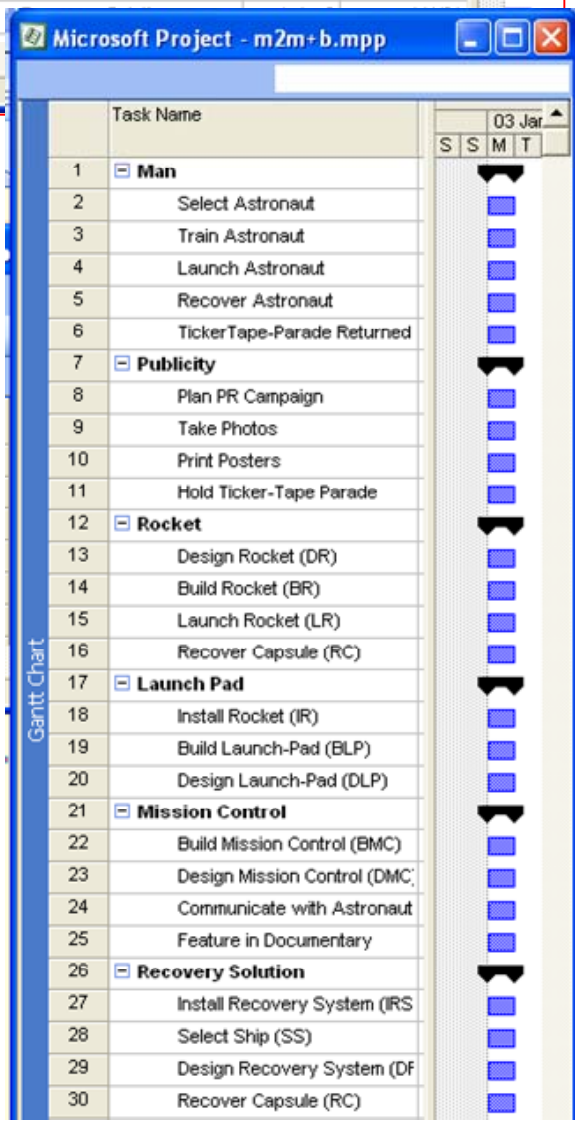
1) A man who has been to the moon and returned safely
2) Lots of publicity (IE a national "feel-good" factor)



Discussion of How to achieve the above two "products" quickly crystallises the assumption that a rocket has a better chance of success than a ladder or teleport system and no one can envisage any other form of solution.

Selection of rocket as the assumed solution implies further needs. In discussion the engineers suggest "return safely" might be easiest with an water borne landing. The need now for:

3) A Rocket
4) A Launch-pad
5) Mission Control
6) A Marine Recovery Solution



These items are modeled in a Product Breakdown Structure (PBS) The PBS is modeled as a list in a scheduling tool.

Someone proposes that "The Moon" be part of the model. After discussion it becomes clear that the project manager cannot take any action or make any expenditure that would create or acquire the moon and while we are dependent upon it the PM would not be accountable if it disappeared. Thus moon is an external dependency but not part of the Impact scope or the scope of work. Someone else proposes that "Money" is an important factor. A resource to be consumed. Perhaps its acquisition should be part of the work scope?

After discussion the conclusion is the PM won't be accountable for securing the money, That will rest with the sponsor. Somewhere the sponsor may model a Resource Breakdown Structure but could have asked the PM to include "Money" in the main PBS if that helps all concerned achieve clarity. As a general rule omit resources from PBS/ WBS unless the project manger is accountable for them. At the portfolio level (IE above the PM someone needs to be rationing resources and they will need in-

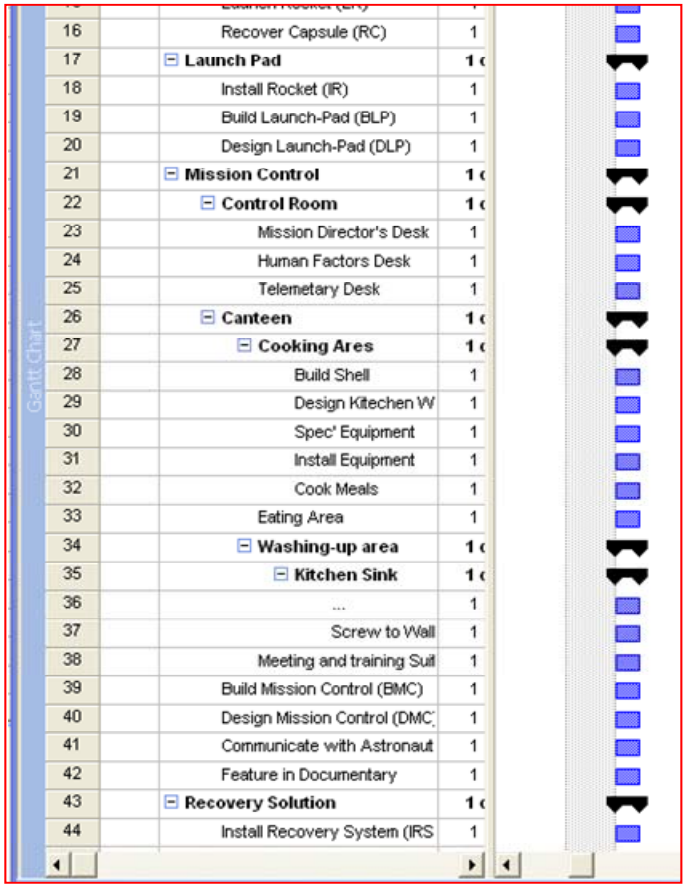
put from the PM on required resource levels to balance scope and schedule – the topic of another discussion.

Man to Moon and Back Safely project is comprised of:

- A man who has been to the moon and returned safely and
  - The lifecycle is {Select Astronaut, Train Astronaut, Launch Astronaut, Recover Astronaut, TickerTape-Parade Returned Celebrity}
- Lots of publicity (IE a national "feel-good" factor) and
  - The Lifecycle is {Plan PR Campaign, Take photos, Print Posters, Hold Ticker-tape Parade}
- A Rocket and
  - The Lifecycle is {Design Rocket, Build Rocket, Launch Rocket, Recover Capsule}
- A Launch-pad and
  - The Lifecycle is {Design LP, Build LP, Install Rocket}
- Mission Control
  - The Lifecycle is {Design MC, Build MC, Communicate with Astronaut, Feature in Documentary}
- A Marine Recovery Solution and
  - The Lifecycle is {Install Recovery System, Select Ship, Design Recovery System, Recover capsule} – remember the BS has no syntax for sequence

Discussion raises concern about clarity of the product Mission Control which will be sub-contracted as a single work-package and so the product is further decomposed

1) Mission Control Is comprised of
2) Control Room is comprised of
3) Mission director's Desk
4) Human factors desk
5) Telemetry desk
6) Canteen is comprised of
7) Cooking area
8) The Sub-Lifecycle is {Build shell, Design kitchen work-flow, Specify equipment, In-stall equipment, Cook meals…}
9) Eating area
10) Washing-up area
11) Meeting & training Suite



Eventually Customer, Boss, PM are all clear on the deliverables, their acceptance criteria, the work to be performed and scheduling, budgeting etc can be performed.

During scheduling it will be identified that there are many tasks "Install plumbing" scattered across the PoWBS and thus a Skill oriented WBS would be really useful too.

Summary

A reliable approach

An early project challenge is to define project scope. It is a challenge because the customer doesn't completely know what they want which is excusable and because we don't know how to capture their certainties and there uncertainties which is inexcusable.

The concepts that underlie our problems have not been well thought through, labeled and discussed. Vocabulary is missing, contradictory, even in places vague twaddle.

The tools we need to use are not well explained anywhere to my knowledge but are simple even if their mastery is a complex journey in human group psychology.

Step 1 – Use a Benefits or Impact or Product Breakdown Structure to define the customer's "what" plus acceptance criteria.

Step 2 – Use a Task or Work Breakdown Structure to define "how" in team terms.

About the Author

Simon Harris, PMP, CGEIT speaks, consults, mentors and trains on governance of change.

Simon helps client's boards with ownership of benefits enablement from "lightbulb" to harvesting.

Simon helps PMs match controls to project uncertainty, complexity and board risk appetite.

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Editor's note: Simon is also nearing completion of a book, **PRINCE2 For Real**, to be published soon. Written with the same combination of deep insights and freewheeling irreverence as this article, a quick look at the draft shows this to be a good one!

Trademarks

[i] http://www.mirm.pitt.edu/people/bios/Strick1.asp
[ii] http://www.musanim.com/miller1956/