3-Work Packages & Estimates

TRANSLATING STRATEGY INTO TACTICS

In this chapter, we'll translate the overall project strategy approved by the executive decision makers into our tactics by:

- *Further detailing our achievement network*
- *Developing our work packages with contractors and internal resources*
- *Making assignments for individuals, and*
- *Negotiating contracts with outside professionals and contractors.*

We will continue the process of planning from the top down. By the end of this chapter, we'll have all the components to build our work breakdown structure, schedule and budget. We will also continue to expand the authority and decision-making matrix. The process is iterative:

- *We develop additional sub-achievements in our network*
- *Request work packages with requirements specifications and supporting plans, costs and risk issues*
- *This allows us to further subdivide the network and request additional work package information as well as expand the achievement network.*

This iterative process requires decisions about the level of control and monitoring we want to build into our project plan. Our aim is to build an achievement network and eventual work breakdown structure that is an efficient and effective tool for integrating all the elements of the project and spotting problems early. The level of detail will not be consistent throughout the plan. Assignments for a new mechanical engineer who is our subordinate will be much more detailed than the achievements of an outside contract architect with whom we contract. In other words we'll complete the achievement network with an eye on the "hunks" of achievement we actually want to track in our project schedule.

But whether the "hunk" is big with a duration of weeks or small with a duration of a day, each achievement will be supported by work package detail with information on detailed requirements, specifications, costs, hours of work and risk. We may reference that documentation in our achievements and later work breakdown structure but we are not going to track progress on ridiculously small "hunks" as that would be a waste of time and effort. Our objective is to develop an achievement network and WBS that lets us track a relatively small number of clearly measurable business outcomes.

All those ideas require a plan for how much detail to build into our achievement network. Another way of thinking about this is to ask ourselves the question, "How do we decide when to stop adding additional levels of sub-achievements to our network?" The answer is when another level of detail will not improve our ability to integrate pieces of the plan and spot problems.

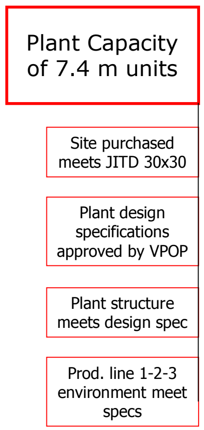
Sufficient Detail in the Achievement Network and WBS
High-Level Achievements (HLA) – The high level achievement may be sufficient detail when it will be managed as 1) a separate sub- project or 2) when a single contractor delivers the HLA in its entirety and there are no dependencies between the stages of this work and the rest of the plan. In a smaller project, we may not sub-divide an HLA if its duration is less than a week or two.
Sub-achievements – One level of sub-achievements may be sufficient when the sub-achievement duration is less than a week or involves only one individual.
Sub-sub achievements – We subdivide down to this level of detail when the sub-achievement exceeds 2 weeks or involves internal staff members or multiple contractors.
Tasks assignments We subdivide down to this level of detail when the sub-sub-achievement exceeds 2 weeks or involves internal staff members or multiple contractors.
Development mode assignments – we made add additional levels of detail for training purposes with new employees, subdividing their work to one-day assignments to give ourselves frequent opportunities for coaching and feedback. We might also go down to this level of detail with people whose quality and productivity standards need improvement. Managing and tracking at this micro level takes substantial amounts of PM time. We should aim to have trainees or problem performers demonstrate that they can move up to a higher assignment level as quickly as possible.

With these general ideas in mind, let's launch into the further development of our Copper Industries case study.

DEVELOPING THE SUPPORTING SUB-ACHIEVEMENTS

Now we'll continue the iterative process of developing the details of our project plan. The team is composed of internal resources drawn from Copper Industries and contractors. We'll use different techniques with each of these groups, but the end result we are aiming for is clear project assignments with a measurable outcome matched with a duration and budget. The process is iterative because some of these resources will actively participate in the development of the plan. As an example, we can't finalize the contract with the General Contractor until the design of the plan is finished. Nor can we place orders for production equipment until the layout of the assembly operation is complete. So we'll move through this process developing the plan in cycles. But our first step is to further subdivide out high-level achievements.

Operating within the framework of the MOS™ and high level achievements, our PM now continues to develop the plan in meetings with the people accountable for delivering the high-level achievements. The project manager uses the high-level achievements that the executive approved to contain the scope and avoids adding features and functionalities that do not contribute to delivering those measured business results. Thus the achievement network we're going to develop will not consist of just achievements delivered by engineering and construction personnel. Each of the high-level achievements identified in the strategic session will require supporting achievements from both the customer and from engineering and construction personnel.



Let's apply the same kind of achievement thinking to the process of breaking the first High-level Achievement, "Plant Building with 7.4 million units production space capacity", into it's sub-achievements. We will also work backwards here although in practice you may move from first to last.

Jack held discussions similar to the session above with a variety of decision makers and then through the major sub-achievements necessary to deliver the plant capacity achievement. Scanning the list, we see that we have several types of measured achievements. Some are approval achievements, usually against a set of "to be developed" detailed specifications. An example of an approval achievement is "Plant design approved for construction by VPOP." We have other achievements that are performance metrics like, "Plant Capacity of 7.4 M units annually" where the achievement is measured by a performance metric. But in all cases, the achievement is an unambiguous end result not an activity like "Design Plant" or "All production lines functional."

It's easy to just list activities and much harder to conceive measured achievements. But basing our plan on clear, unambiguous outcomes gives us a sound basis for contract negotiations with outside firms and assignments to internal members (customer employees) on the project team.

Our aim is to use measurable decision criteria, preferably numeric objectives. However, at the sub-achievement level we may use approval of plans, specifications, or technical features.

So even though we kept the diagram statement short, the specifications provide clearly stated measurable objectives. The "Site purchase" sub-achievement above must meet the requirements for JIT delivery JITD. Remember back in the beginning the plan was to build the plant within 30 miles of the Canadian Border and within 30 miles of the Burlington airport. If the plant were outside these criteria, we would jeopardize the JIT delivery. Let's take the second level achievement "Site purchased meets JITD 30x30" and look at the third level of achievements necessary to deliver it.

- *7.4m Space Capacity Plant*
- *Site purchased meet JITD 30x30*
  - *JITD Specification approved by VPMK*
  - *Signed contract with REC*
  - *5 site alternates meet JITD spec*
  - *Site location approved by VPOP*
  - *Site purchase executed by CFO*

This set of achievements will form the basis for the contract with the Real Estate Consultant (REC) and details the performance expectations that will be the core of the contract. We show the development of the 30x30 specifications (within 30 miles of the Canadian border and within 30 miles of the Burlington Airport and additional requirements for the "Just in time delivery." Then we ask the realtor for 5 sites that meet those specs and move on to final approval. By using these achievements we clearly communicate our expectations to the realtor and also provide a basis for that professional to estimate the hours required to deliver them.

Now let's look at the subdivision of the next second level achievement into its supporting sub-achievements.

- *Plant approved for construction by VPOP*
  - *Signed contract with Architectural/Engineering firm*
  - *Building design approved by VPOP*
  - *GC contracted per design spec*
  - *City/State/Federal Permits/Approvals Issued*

The approach in the above achievements is similar, with the outside contractor, an architectural/engineering firm, responsible for the facility design and then executive approvals of their work. Each of these achievements specifies an end result; not all the steps necessary to reach that end result. As an example the last achievement on government approval/permits does not tell the individual (probably from the General Contractor) what permits and approvals to get. We've laid out the just the end result because that is what we will manage. In the supporting project documentation, we'll maintain a listing of the approvals but only in rare cases would we schedule and track the application process for each permit or approval. Far better to hold people accountable for end results than for activities.

Now we'll move down and look at the detail supporting the third sub-achievement.

- *Plant structure and systems meet design specs*

- *Site prepared for foundation to meet specs*
- *Foundations set to meet specs*
- *Underground utilities installed to meet specs*
- *Floor set to meet specs*
- *State Inspect. & A/E approve foundation to meet specs*
- *Steel frame & roof 100% to meet specs*
- *Exterior shell & insulation 100% to meet specs*
- *Main Electric Xfmr & Service 100% to meet specs*
- *Rooftop HVAC 100% to meet specs*
- *State Inspect. & A/E approve shell*
- *Rooftop HVAC supply heat to meet specs*
- *Electric distribution in production area to meet specs*
- *Electric distribution system to meet specs*
- *HVAC air distribution production area to meet specs*
- *HVAC air distribution to meet specs*
- *Interior office 100% complete to meet specs*
- *Fire & life safety systems to meet specs*
- *Certificate-of-Occupancy issued by State Inspector*
- *Architect signs-off on As-built docs*

The preceding achievements are all tied to meeting design specifications and inspections. Later we will make the decisions on how much additional detail the plan needs. Certain lengthy achievements with durations of more than 6 weeks may be broken down into smaller work packages for scheduling and tracking purposes. Other short duration achievements may be bundled in one large work package for the same purpose.

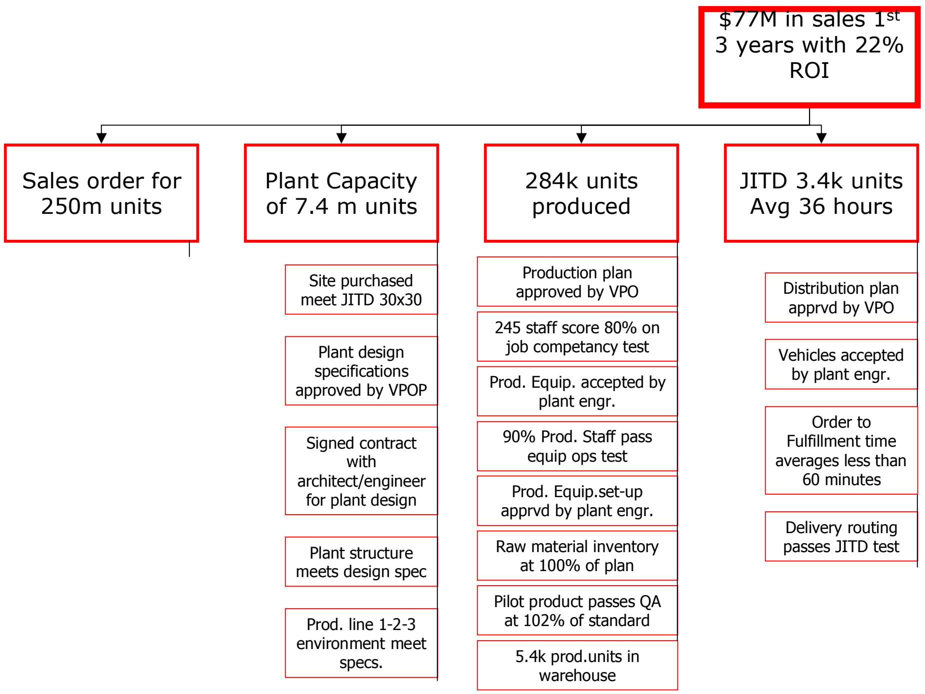
Here's the last set of supporting sub-achievements:

- *Prod. line 1-2-3 environment meet specs*
    - *Air quality exceeds specs*

- *Power quality exceeds specs*
- *Compressed air provides specified volume*

We would take a similar approach in subdividing the other high-level achievements in our project plan, working the individuals and contractors whom we will hold accountable. Note below that there are no sub-achievements under the “Sales Order” HLA. This will be managed and tracked by the Canadian Regional Sales Manager so we will not track any of the supporting achievements. Our reasoning is that none of those sub-achievements will impact the other HLAs or their sub-achievements so no integration effort is required of the PM.

We’ve looked at the process of detailing the second and third level achievements under one of our high-level achievements. Our project manager has been asked to track the entire project and so will participate in developing similar sub-achievement structures for two other HLAs. Why should our PM get involved in achievements outside the pure construction work? Because these other elements are critical components for project success. Let’s look at the rest of the detail to the left.



With this additional detail of sub-achievements we’ll consider the development of work packages. We’ll divide this discussion into two pieces. First, we’ll talk about techniques for staff from the customer’s organization and our people from our organization. Second, we’ll deal with resources for which we will contract.

WORK PACKAGES

For both our internal resources and contractors, we will use a work package form to document the cost/work estimate and the additional specifications and information that supports that estimate. The work package format may be no more complex than the simple form below. For larger achievements it may run to hundreds of pages while a single sheet may suffice for our two-day assignment to our junior engineer. The work packages are assigned to the responsible resource for estimating task labor (work) and material cost, task duration and detailed task activity planning. We also use the work package to gather information for later use in determining our contingencies and assessing the risk.

The level of input and output required from the resource (whether from the customer's staff, the PM's own organization or a contractor) to complete the package will depend on their level of involvement in the project. We'll define level of involvement of a team resource at three levels.

Resource Involvement		
Level of Involvement	**Description**	**Work Package Elements Provided by Resource**
Participation	Requires technical judgment for an adaptive solution. Resource provides the majority of the work package information.	70 to 100%
Vendor	Requires evaluation of features & specifications related to scope or work. Usually provides "Approach", "Output" and "Issues" elements.	40 to 60%
Commodity	Output requirements readily available and similar from a multitude of resources. Usually provides price only.	10%

We will rely very heavily on the technical and professional judgments of certain of our team members. Others may be asked only to provide a price.

Example of resource involvement levels		
Participation	**Vendor**	**Commodity**
❑ *Production Engineer* ❑ *Architect/Engineer*	❑ *General Contractor* ❑ *Real Estate Consultant* ❑ *Production Equipment Supplier* ❑ *Distribution Supervisor*	❑ *Raw Material Supplier* ❑ *Plumbing Contractor* ❑ *Landscape Contractor*