

WORK BREAKDOWN STRUCTURE FROM THE FIELD

How to break down the installation work to identify risks at the beginning of the job

By **DR. PERRY DANESHGARI** and **DR. HEATHER MOORE** with contributions from **SONJA DANESHGARI**

Construction jobsites are often unpredictable and impacted by daily changes. In order to reduce the impact of the daily changes, an electrician needs to see the work ahead of them. This is the power of a comprehensive Work Breakdown Structure (WBS). A WBS is a method to identify the necessary tasks that are needed to complete a specific job. The identification of tasks needs to be done by an electrician who is physically doing and leading the work (General Foreman or Foreman). To create a WBS, you bring the whole project team together to discuss and break down the project into small, manageable tasks. By writing down the individual tasks you will start to identify unanswered questions and potential risks. Once complete, the WBS can serve multiple functions. You can use it to accurately monitor job progress, real-world completion levels, and overall productivity to reduce the job risks and predict and prevent upcoming obstacles.

Now, let's take a minute to understand how a WBS is created. Before we start, we need to gather the project team all in one room. This would include everyone who knows anything about the job, as well as the field team that will need to know about the job. This should be the Project Manager, General Foreman, and Foreman. Depending on the size of the job, we can also include the Purchasing Manager, Prefab Manager, Estimator, and Vendors. Once everyone is gathered together, we then can start to identify the work.

WORK

Your work is the only thing that needs to be identified at the beginning of a WBS. The focus needs to be on the overall tasks that need to be done at the jobsite (investigation, temporary lights, layout, pipe, concrete pour, framing, grounding, demo, etc...). Another way to go about this is to ask, "What are the main items that need to be done for this job?" This question needs to be answered by the electricians. To utilize this tool correctly, the WBS needs to be created by the lead field person that will actually end up coordinating and installing the items onsite. As he or she is identifying the work items, start to write them down on sticky notes and stick them up on the wall. Figure 1 shows an example of a start of a WBS with the main tasks for the job identified. Please note that it is not important yet in which sequence or detail the items are identified or noted. To start every WBS, it is highly recommended to work with sticky notes or a white board,

since there will be a lot of revisions made to tasks until the WBS is complete.

BREAKDOWN

After all the main items are identified, the actual breakdown of the work can begin. You keep breaking down the work by asking yourself, "What does that mean?" or "What does this include?" Only by breaking the work down will it be possible to identify all the little items in-between the main installations as well as items that you may have forgotten during the first go-round of identifying tasks. The sub-tasks will also need to be broken down into manageable pieces for an electrician to complete in a week's time. Depending on the job size, the detail of the breakdown can vary, but one sub-task should not exceed a week's worth of effort. Example: If you're putting up a fire alarm – ask yourself, "What does this task mean and what does it require?" Start listing it below your main

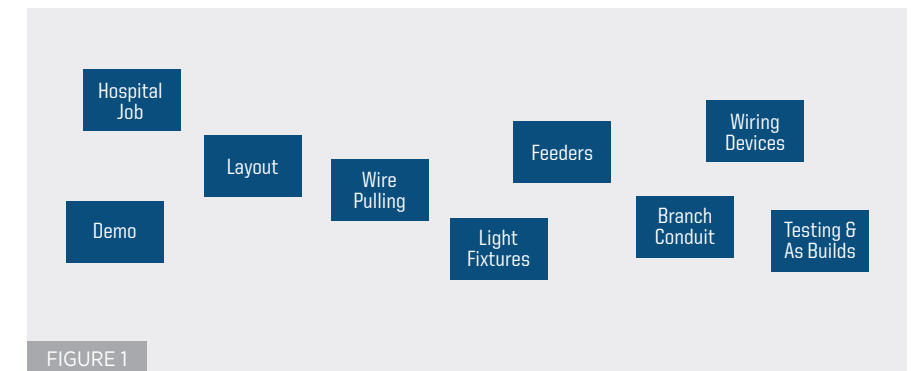


FIGURE 1

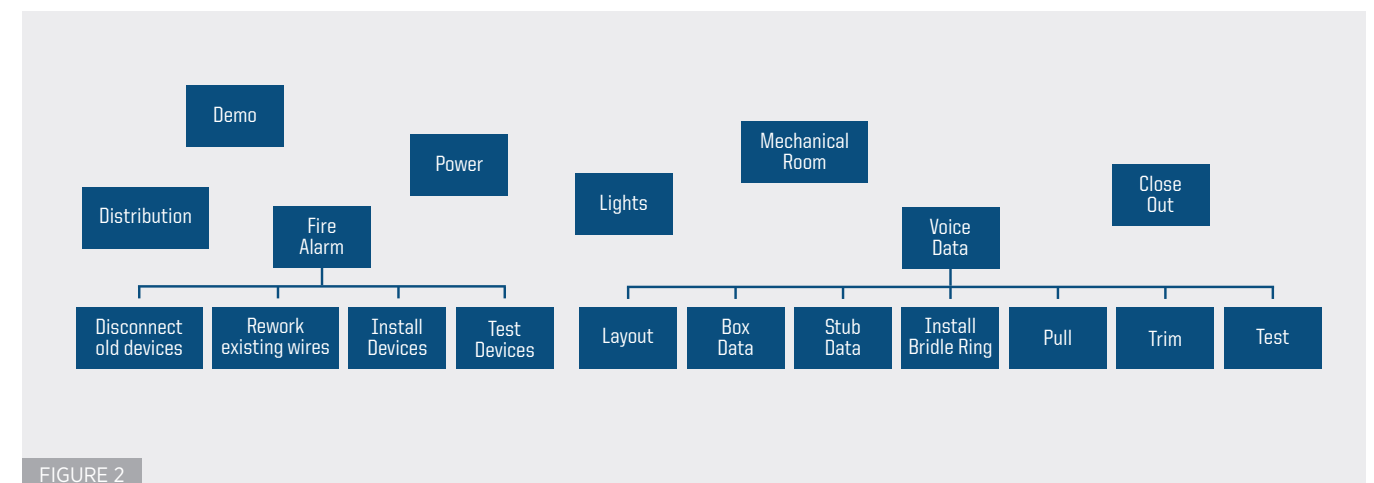


FIGURE 2

FEATURE

items, such as disconnect old devices, rework the existing wires, install the devices, and test. In Figure 2, you can see a WBS with a detailed breakdown of fire alarm and voice data.

After you've identified all of the work items and broken it down into manageable pieces, you can then start to look at the structure.

STRUCTURE

Last but not least, it is important to look at the identified tasks and see which order or which structure makes the most sense. The structure needs to be put in place to group the items to the main task. This can be done in different ways, but the same rule applies to the structure as to the whole WBS: There are no wrong or right ways, just all task items to complete the job need to be identified and be able to roll up under a main task. A WBS can be structured by functions, such as: Distribution, Power, Lighting, Fire Alarm, or Closeout as you can see in Figure 3. A WBS can also be structured by location: First Floor, Bathrooms, Mechanical Room, Building Type, West Wing, etc., and then broken into your functions. The key part to how the WBS needs to be

structured is so an electrician can identify themselves with this structure. Therefore, the structure needs to come from the electricians who are actually installing and coordinating the work in the field. In Figure 3, you can see an example of a full WBS with the main task items identified, as well sub-tasks broken down below.

The WBS is complete when the question, "Are all the items on the WBS that you need to do to be able to walk off the job without having to come back done?" can be answered with a "yes." Now you and your whole project team should have the same understanding of how this job will be built and what the open questions and potential risks are. If you also want to use the WBS as a base for a job productivity measurement of your job, you can start to add the effort in hours to every sub-task. As you can see in Figure 3, the project team started to add the hours, as well as cost code numbers, to the sub-task. On a weekly basis, the Foreman will write down the percent-complete for the task sub-items he worked on, which will help to see the correct job percent-completion and productivity progress on a weekly basis. The tools of ASTM Standard 2691 that are built on the concept of WBS to see the productivity of the job as well as the obstacles on the jobsite as accurately as possible are JPAC® (Job Productivity Assurance and Control) and SIS® (Short Interval Scheduling).

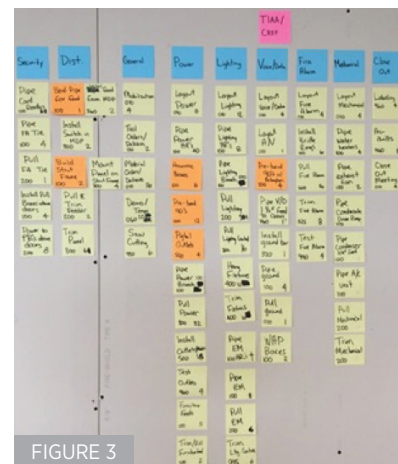


FIGURE 3

More information to this can be found at www.mca-soft.com and www.mca.net.

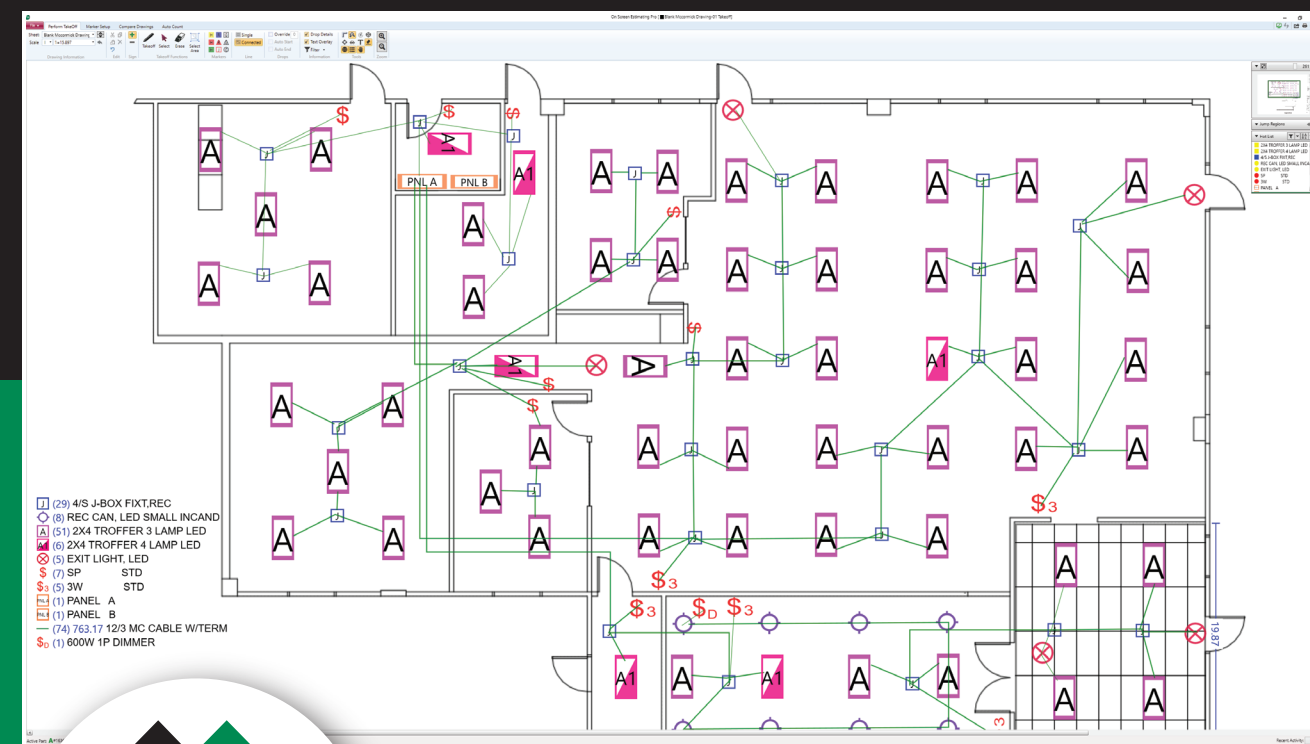
Through a WBS, a project team can create a baseline that now can be used to plan and track a job on a frequent basis and connect back to planning and scheduling tools, which now will allow a realistic view of your job risk, progress, and productivity.

Dr. Perry Daneshgari is the president/CEO of MCA Inc. MCA Inc. is a research and implementation company that focuses on implementing process and product development; waste reduction; and productivity improvement of labor, project management, estimation, accounting, and customer care. He has published four books and an ASTM Standard for Job Productivity Measurement.

Dr. Heather Moore is vice president of Operations for MCA Inc. She holds a Ph.D. in Construction Management from Michigan State University. Additionally, she holds an MBA from University of Michigan (Flint) and a B.S.E. in Industrial and Operations Engineering from the University of Michigan (Ann Arbor). She was a contributor for the ASTM Standard E2691, "Job Productivity Measurement," and was co-author of the newly published ASTM book, "Application of ASTM E2691 Standard Practice for Job Productivity Measurement in Agile Construction®."

Through a WBS, a project team can create a baseline that now can be used to **plan and track a job on a frequent basis and connect back to planning and scheduling tools.**

McCormick System's v14 Reinvents Estimating and Design/Build Software!



Contact Us For A Demo of all the revolutionary changes!

- Completely re-written in SQL
- Same user friendly interface
- Unrivaled Design and Estimating Speed
- Rock Solid Stability
- True Multi-user platform
- Design Build and Estimate at the same time!

v14

If you haven't seen McCormick lately...
You really haven't seen McCormick!



MCCORMICK
McCormick Systems, Inc



Microsoft
CERTIFIED
Partner

Call for more info: 1-800-444-4890
or visit: www.McCormickSys.com