

Lean Shutdowns

Reduce unwanted fat from your next outage

By Joel Levitt

For companies (i.e. oil and gas industry) that run continuously, shutdowns and outages consume a lion's share of maintenance and capital budgets. By its very nature, the shutdown is "fat." The reason for this is the skewed balance between downtime expenses and the cost of shutdown resources. In some cases, having extra resources, such as cranes, are dwarfed by the avoided cost of downtime. Shutdowns are also fat because of an attitude that includes worrying about the budget when it's over.

This attitude had been acceptable, particularly when there was an increased demand for product and higher commodity (oil/gas and mining) prices. Times have changed, however, and it's important to re-think your approach to shutdowns. All parts of the organization now come under budget scrutiny. As a result, we're running our shutdowns under tremendous pressure.

One strong temptation is to cut corners on safety or environmental issues. For example, I can't imagine skimping on fall protection harnesses or safety glasses. Small improvements in managing shutdowns can provide large weight losses for the maintenance department. The key is to cut waste without compromising safety or environmental compliance.

You want to improve shutdown events without compromising safety or environmental security. Based on my experience from a variety of shutdowns in the oil/gas, utilities, mining and primary metal industries, here are some important actions to take:

1. At the beginning of a shutdown (when you start opening things up), you may discover some surprises. Some ideas to reduce this occurrence include:

- Open everything on day one;
- Keep a history based on previous experience. Such a history will be important, as it will show any deterioration in efficiency. A lot of things deteriorate at a relatively constant pace and they have similar failure modes;
- Diagnostic predictive maintenance technology (i.e. infrared and vibration analysis) might give an indication of what's going on. Schedule non-destructive testing (NDT) right before you close the work list;

- Maintenance workers on an oil platform in the Gulf of Thailand do a mini-shutdown before conducting a bigger shutdown. When they do a mini-shutdown, they open everything up, perform inspections, close the job and go back into service. This isn't possible in a lot of places, but crewmembers said their shutdowns were relatively controlled and didn't produce a lot of surprises.

2. If there are more than 25 tasks in the shutdown (a very small event) then using software for project management will lean up the shutdown by shortening the duration. Be sure planners and schedulers are well trained in the project management body of knowledge (PMBOK), including intimacy with whatever software package you use. The advantages are simple:

- By calculating the critical path, you know early on if the project is on or off schedule;
- By realizing the tasks that are on or near the critical path, you know what to focus on;
- Knowing that without extra intervention, if a critical path item is behind, then the whole project will be late;
- You can see a problem coming when it's small enough to easily fix; and
- You can create displays that explain the shutdown and show its current status.

3. Did you know that 85 percent of planning and scheduling is done before the shutdown begins. The point of planning is to identify the elements of a particular, unique job. The main point of scheduling involves precisely bringing together the key elements of a unique specific maintenance job:

- People with the right skills to perform the job and are physically able and mentally alert;
- Safe job steps;
- Correct parts, materials, tools, supplies and consumables for the job;
- Adequate equipment for lifting, bending, drilling, welding, etc.;
- Personal-protective equipment (PPE);
- Proper permits and lock outs;
- Custody and control of the asset;
- Safe access to assets, safe-work platforms and humane working conditions;

- Updated drawings and wiring diagrams and other information; and
- Proper waste disposal.

Make sure you take advantage of the time before the job starts to line up all of the elements. Remember if any item is missing, the job will stop or people will improvise, which increases the probability of a problem with quality and safety.

4. Keep an eye on the over-ordering of materials and returns as soon as possible. When the shutdown is completed, the tendency is to shove all the extra material into the storeroom and take a credit for the value. In this way, the shutdown budget is helped, but there's an overall cost to the organization unless the material is used in a fairly short time. Many storerooms have leftovers from projects and shutdowns for years after the event.

5. In terms of whether there's enough supplies for the whole shutdown, the planner should put his/her hands on these items and not accept the computer's inventory level. Supplies include rags, oil-dry compound, welding rod or wire, gases, nuts and bolts, etc. Shutdowns have been stopped in their tracks because someone made an assumption about simple resources (i.e. running out of welding wire or rod, not having enough torque wrenches).

6. Keep an eye on the excessive numbers of rented cranes, welding units, generators, compressors, tanks, scaffolding and other equipment. Investigate and return what's clearly not needed and doesn't provide any benefit, unless it's there to provide insurance against some significant loss. Return rentals of all kinds ongoing as soon as practical.

7. Be on the look out for situations where resources are being paid for, but because of resource levelling problems, they're not being used. Have some lean projects to use them. This would also include spending a little extra to leave scaffolding to do some routine maintenance after the shutdown, or keeping cranes for a few extra days as well as labour during the shutdown.

8. Validate the work list and remove duplications, remove jobs that aren't essential and be sure the wording of the work requested is clear. On individual jobs, look at the scope of work as a contractor would. Be sure it's as clear and complete as possible. A better scope will result in lower prices if there are fewer unknowns.

9. Settle claims with your contractors promptly.

10. Good meetings are essential to the success of the entire shutdown effort, while encouraging the lean process. Wasted meeting time is highly leveraged. If there are eight people at a meeting and

they're waiting for the ninth, then the group's time is being wasted. It isn't just one person's time; the loss is leveraged and time involving the eight people is gone. You've got to have productive meetings. The lean project here might be to train people in the better handling of meetings.

People come in late for meetings or don't do their homework. They don't pay attention and then act inconsistently with the decisions of the group. As well, they don't have good discipline and management often doesn't have a good behaviour model for meetings, either. By the way, do you have rules about sending text messages or checking email during meetings?

This is an edited article written by Joel Levitt, president of U.S.-based Springfield Resources. You can reach him by email: jdl@maintrainer.com. The article is partially adapted from "Lean Maintenance" and "Managing Maintenance Shutdowns and Outages" textbooks both published by Industrial Press (www.industrialpress.com).