



# Lean shutdowns

## 10 ways to make your shutdowns more lean without cutting corners

BY JOEL LEVITT

For most companies that run continuously, shutdowns and outages consume a lion's share of both the maintenance and capital budgets. By its very nature, the shutdown is fat. The reason for this is the skewed balance between the cost of downtime and the costs of shutdown resources. In some cases the costs of having extra resources (such as extra cranes) are dwarfed by the avoided cost of downtime. Shutdowns are also

fat because the attitude is "Get 'er done and we'll worry about the budget when it's over."

Times have changed. This old approach to shutdowns is taken too far and in itself becomes a fat. It is certainly a fat approach now when times are tough and prices and demand soften. The fact that the downtime is more expensive than resources under any economic condition doesn't justify the waste of resources.

There is a looming danger. The economy is in flux and many of our organizations are financially stressed. All parts of the company come under scrutiny for budget cuts. As a result we are running our shutdowns under tremendous pressure. The temptation to cut corners on safety or environmental issues is strong.

Usually the temptation to cut corners is not about present activities. I can't imagine skimping on fall protection harnesses or safety glasses. I can imagine and have seen companies apply temporary fixes rather than replacing pipes and design plants that are less expensive to build, but more expensive to operate.

Small improvements in managing shutdowns can yield significant weight loss for the maintenance department. The key is to cut the waste without compromising safety or environmental compliance.

Based on my experience with shutdowns in oil, utilities, mining and primary metal industries, here are 10 concrete ideas to implement that will

“lean up” the shutdown event without compromising safety or environmental security.

**1) Discoverables are a key source of fat.** Discoverables are jobs that are “discovered” after the shutdown starts (when you start opening things up.) Some ideas to reduce the surprises:

- Minor machining operations (turning down, reaming, broaching).
- Open everything on day one.
- Keep a history based on previous experience. Such a history will be important because it will show the deterioration in efficiency, if any.
- Diagnostic technology (including predictive

maintenance techniques such as infrared, vibration analysis, etc.) might give an indication of what's going on. Schedule non-destructive testing (such as X-ray) right before you close the work list.

- One option for reducing discoverables is to conduct a “pre-shutdown.” Maintenance workers on an oil platform out in the Gulf of Thailand do a mini-shutdown before they do their big shutdown. When they do the mini-shutdown they open everything up; inspect it, close it up and go back into service. That’s not possible in a lot of places, but in this situation the crew said that their shutdowns were relatively

controlled and didn’t produce a lot of surprises. The amount of discoverables was dramatically lower, but the crew still had to convince management. Could you imagine this: “We want to do two shutdowns instead of one? You know, in order to manage the one, we’re going to do another one.”

- Another Asian group did a dry run. A pharmaceutical company hired a contractor to do a complete dry run before the main shutdown. They acted everything out before they touched the equipment. The company paid for it, but when that shutdown started, it was like a choreographed dance

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troupe rather than a keystone cops episode.

■ The same company hired the shutdown contractor to draw up and start to plan the next shutdown while they were doing the dry run. With all the equipment opened up, the contractor could make measurements, do sampling and testing, and even count gear teeth to get a jump on the next shutdown.

**2) Bad meetings are fat.** Yet, good meetings are essential to the success of the entire shutdown effort and are lean. Wasted meeting time is highly leveraged. If there are eight people at a meeting and they are waiting for the ninth, the time of all eight people is wasted. The lean project here might be to train people in better meeting practices to make the meetings more effective.

Many companies have bad meeting habits. People come in late, or don't do their homework. They do not pay attention and then act inconsistently with the decisions of the group. They don't have good discipline around meetings, and management often doesn't model good meeting behavior. Start sending people to classes in how to run meetings and improve your meeting sophistication. By the way, do you have rules about texting or checking e-mail during meetings?

**3) Use project management software.** If there are more than 25 tasks in the shutdown (a very small event) then using

project management software will lean up the shutdown by shortening the duration. Be sure the planners and schedulers are well trained in the Project Management Body of Knowledge (called PM BOK) including familiarity 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 knowing the tasks that are on or near the critical path you know what to focus on
- You can anticipate if extra intervention is required to prevent the whole project from being delayed
- You see a problem coming when it is small enough to fix easily
- You can create displays that explain the shutdown and show its current status

**4) 85% of the planning and scheduling work is done before the shutdown begins.** The point of planning is to identify the elements of a unique job. The main point of scheduling is bringing together in precise timing the 11 elements of a unique specific maintenance job:

- Person(s) who are physically able and mentally alert with the right skill(s) to perform the job
- Safe job steps
- Correct parts, materials, supplies, consumables for the job
- Correct tools
- Adequate equipment for lifting, bending, drilling, welding, etc.
- Personal Protective Equipment (PPE)
- Proper permits and lockouts
- Custody/control of the asset

- Safe access to assets, safe work platforms, and humane working conditions
- Up-to-date drawings and wiring diagrams and other information
- Proper waste disposal

Make sure you take advantage of the time before the shutdown starts to line up these 11 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.)

**5) Keep an eye on over-ordering of materials and return unused inventory as soon as you know you won't use it.** When the shutdown is complete, the tendency is to shove all the extra material into the storeroom and take a credit for the value. That helps the shutdown budget but there is 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.

**6) Note explicitly whether there are enough supplies for the entire shutdown** (the planner should put their 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 the availability of simple resources.

**7) Keep an eye on excessive numbers of rented cranes, welding units, generators,**

**compressors, tanks, scaffolding and other equipment.**

Investigate and return what is clearly not needed and doesn't provide any benefit, unless it is there to provide insurance against some significant loss. Return rentals of all kinds as soon as practical.

**8) Be on the lookout for situations where resources are being paid for but are 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 labor during the shutdown.

**9) Validate the work list and remove duplications.** Remove jobs that are not 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.

**10) Settle claims with any contractors promptly to avoid additional fees and penalties.** Reducing the fat in your shutdowns can provide large payoffs for your plant in both time and money. Implementing any of the above 10 ideas can put you on the road to leaner

shutdowns. Remember, small improvements yield large results. ☉


Joel Levitt has trained more than 15,000 maintenance leaders from 3,000 organizations all over the world. Since 1980 he has been the President of Springfield Resources, a management consulting firm that services clients of all sizes on a wide range of maintenance issues. He has more than 25 years experience in many facets of maintenance including serving in the roles of process control designer, source equipment inspector, electrician, field service technician, merchant marine worker, manufacturing manager and property manager.



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