Inspired Blended Learning™ Case Study

R.A. Jones Cartoner

Reliability Improvement Project

Version 1.0

Where Education Meets Application.

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INSPIRED BLENDED LEARNING™ CASE STUDY

The Purpose of this paper is to establish what was learned through the course of my project for Blended Learning. Through the focus of several exercises, I have been exposed to different looks on how Reliability can be instituted through various roles in our process.

BACKGROUND HISTORY

My plant was built in 1968 in Naperville, IL. In the beginning it was the brain child of Nabisco and was a producer of several cereal products, most using wheat as the main ingredient. Through the years, the plant has been bought and sold several times, and ironically; it has come full circle around to be called Mondelēz International –Nabisco division: the maker of all of the Triscuit Crackers for the whole United States.

The building has largely been updated to relatively latest standards with a full complex of Programmable Logic Controllers (PLC) with Ethernet interconnections. This has helped the Mean-Time-To-Repair (MTTR), by allowing the Technicians to connect to a processor in a matter of a few keystrokes. Another enhancement is ZPI reporting process. This has allowed multiple shareholders of varying expertise to evaluate a running process of any given line, at any given time. This tracking data shows exactly where the deficiencies are in the line and where efforts need to be concentrated within a few hours.

MY PROJECT LINE

The Naperville Plant is designated with 5 different Production lines that consist of a wheat shredding line, an oven the length of a football field, an oiler and a salting unit. On the other end of the plant, there are 5 different packing lines with different potentials. They all consist of 3 or 4 Scale/bagger machines, a Cartoner, a Checkweigher, a Metal Detector, and a Bundler. Many of the Processing lines can be interchanged with each of the Packing lines. I chose packing line #9. It is considered the work horse line because of the high volume that it produced as a standard. At the time of my project selection, this line was struggling to keep pace. The uniqueness of this project is that, what is learned on one line can be morphed into another line because of similar machine and processes.

Our First Obstacle

In the beginning of my project, the R.A. Jones Cartoner was definitely the choke point. The machine would run for about 45 minutes and then have a series of jams. Many times, when the jams occurred, they would take out a series of plastic lugs, putting our on-hand stock in jeopardy. In a somewhat unorthodox way, we used a FMECA process to figure out what could be causing the repetitive "jam" problems. Through non-intrusive analysis methods, we determined that the gearbox had a bad gear tooth and in a 45 minute time interval the defective gearbox would gradually let the machine walk out of timing. We replaced the gearbox with one that we mistakenly had in stock (too high of overhead and no short term need) and the problem was solved. I think that this helped drive home the process of being methodical on how to trouble shoot effectively.

Continuing The Process

Tackling the first obstacle, and resolving a repetitive downtime contributor, helped buy us some time to go through the reliability program in a systematic way. We studied about the hierarchy and its role in establishing Asset Criticality. Criticality is a major component towards helping understand what the key players are in a process. Many of the machines were kind of understood as to which ones were the most intrusive to the process based on collective downtime, however, there were several pieces of equipment that were overlooked based on their size. In other words, a small machine, like a Checkweigher, could have significant impact on the total overall performance of a line. Besides stepping up the normal maintenance routines to this machine, we have made sure that we have a redundancy plan, if it should fail to weigh properly. The significance of this strategy is that the lines all mirror one another in the lay-out, brands of equipment and even their relative vintage, so the criticality can be easily adapted to other Packing lines.

After the hierarchy had been established, we continued with the Bill of Materials (BOM). I was fortunate enough to walk into an established CMMS system known as SAP. The SAP software already had an

implemented structure for BOM. One thing that has been identified, as a follow up, is being able to go back and branch each BOM so that it has Component break downs inside each machine, instead of the current day "toy chest" approach where all parts are under one machine. This is an ongoing goal for the Maintenance Planning department.

From the BOM's the Naperville plant is working back toward how much inventory should be on-hand. Some things we are doing to be proactive about this are, 1) identifying true on-hand commodities of parts, 2) establishing "Just In Time" deliveries with designated vendors (even if it means waking a salesman in the middle of the night), and 3) job ordering and reverse engineering certain parts that can be made locally, as a convenience and as a cost savings.

When we looked at MTTR for specific events, I developed a team to help us come up with better ways of maintaining critical assets. One project was "L" shaped buckets on the Cartoner machine. If one got bent due to a large product jam it could take several hours to repair. The machine would have to be jogged to an area where it was clear to unbolt and re-attach a new bucket and plastic retainer. We developed an idea where the bucket was bolted from the top so there was no need to precisely jog it and the buckets and retainers where about a third of the cost. This brought the MTTR for this particular job down to within 1 hour.

Following the next ideology taught within the *inspired* Blended Learning program, we focused on developing a more effective Preventive Maintenance (PM) strategy, utilizing predictive technologies such as Ultrasound, Fluke Infra-red, and Oil Analysis. This is an area of immediate opportunity for the Naperville Plant in order to transition our intrusive, shutdown maintenance routines into running quantitative inspections.

Sustaining Our Reliability

Our plant is in a variety of culture changes, from when we do maintenance ("fire-fighting" verse PM routines) to the maintenance approach itself (itemized, planned routines versus catching it on a discovery). I believe both of these cultural shifts need to be supported by both the maintenance group and the overall plant. If a maintenance mechanic is assigned to a do a PM routine, the rest of the plant needs to understand the importance of the task. Once the culture starts to accept the new routines and maintenance approach we can expand the tasks to include Condition Monitoring (CBM) routes and other higher level opportunities.

Our upper management understands the need for the cultural shift and is backing it with results driven from ZPI to help show root causes for lower production numbers. I feel the next step to this is re-instating a Reliability Engineer position to help drive where the focus needs to be.

Words Of Wisdom

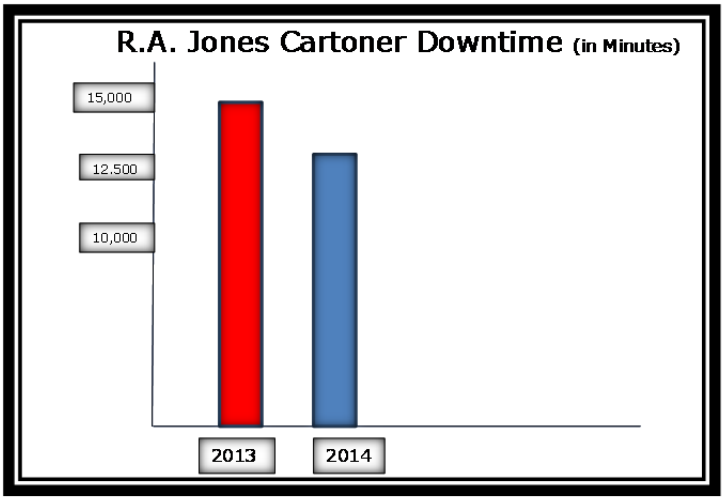
In looking back at the process, I would suggest a few of things. The first and most obvious is being able to commit time to reliability improvement projects. Taking day-to-day activities and documenting them

throughout the improvement process so that you can convey what you learned from each learning exercise. This can sometimes make a small task very long but it helps exemplify what has been discovered, and learned.

Second is setting up your learning metrics so that you can see small victories. In other words, be able to jump around in the different modules to complete a task that may take a couple of hours, all the while working on a project that may take several days. The little victories helped me make it seem possible to complete this course while doing my regular Maintenance Supervisor job.

Lastly, keep an ongoing binder with chronological order of the "White Papers". This is the most helpful tool to study from when preparing to take exams. I figured this out on my second to the last exam. I was trying to memorize stuff that was otherwise difficult to retain without the valuable resources associated with the *inspired* Blended Learning program.

This course can open your eyes to how good maintenance is done. Many times people think that maintenance is just an oil can and a rag. Through this course, we learned that things like naming fault codes, aligning part inventories, archiving processed work, breaking down equipment into BOM level entries, and designing "critical" lines to be reliably from the beginning; all play a large part in how Reliability can play a huge role in day-to-day maintenance and operations activities.



The Statistical Difference

At the completion of my project, I wanted to look back and see if some of the things we did made a difference. Obviously there are varying factors that can change how a production line looks and runs. By no means do I feel that I caused the whole effect, but I am pleased to announce that, after comparing line performance in 2013 (at the start of my project) with 2014 (during the conclusion of my project), our downtime for the Jones Cartoner dropped by 39 hours, and the baggers, all total, fell 452 hours. This means that in 2014, we had the producing capability of an extra 486,720 cartons of Triscuits because of less downtime, which has the potential to generate an increase in annual revenue of nearly $400,000. The interesting part is that this is just 1 of 5 lines.

