

Project Name

Reliability and Maintenance Improvement Project – Paper mill in South Carolina

Content / Scope of Engagement

In 2014 the mill had a directive to improve the production output through maintenance uptime while keeping the fixed cost the same. An increased output would increase the margin in a highly competitive and in some cases shrinking market.

IDCON was engaged in 2015. We started by conducting the Current Best Practices (CBP) audit for the mill. The mill scored a 33 versus a best in class score of 75. The reliability of the Mill’s paper machine 3 (PM3) was lacking vs. other mills within the company. Maintenance unscheduled downtime was 6.4% in 2014.

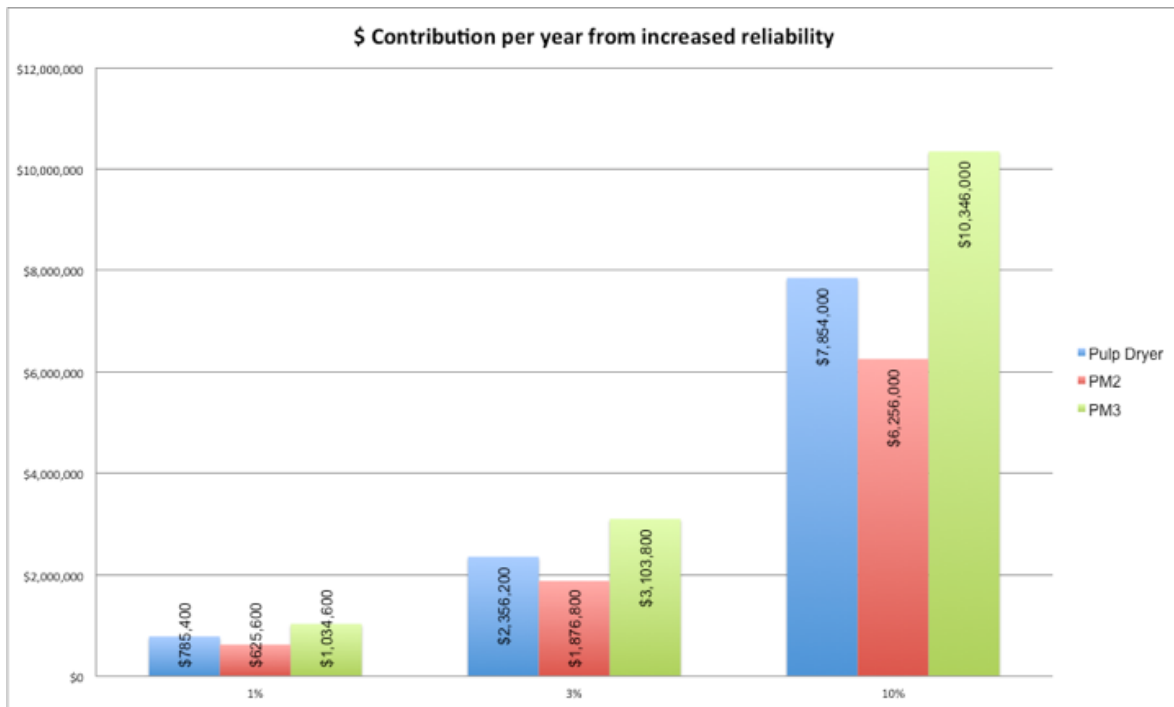


Figure 1: Contribution margin improvement based on increased reliability

Starting State

- PM3 unscheduled downtime was 5.1% in 2015
- Production schedule and maintenance schedule were not coordinated, which caused machines to be down longer or in some cases required corrective maintenance was deferred.
- The mill had defined many PM’s in the documentation system, but very few work requests were generated based on the inspections.
- There were repetitive failures and breakdown with AC motors, DC motors, cranes, jackshafts, roll bearings, hydraulics.
- Very few jobs were planned.

- Lubrication was documented; when executed around 50% was completed on time and some were not completed at all.
- Operators did inspect the machine.
- Production and maintenance relationship was: “maintenance crafts maintain and operators operate”.
- There was no organized cleaning effort of the equipment.
- Team leaders were designated as supervisor but were not empowered to do performance management of crafts people in order to motivate and hold them accountable.

Achieved after 18 Months

- Shutdown on time improved - See Figure 2 for critique score trend.
- Motor breakdown rate significantly decreased – See Figure 3
- PM 3’s bearing breakdown rate decreased
- PM 3’s unscheduled down time at 2.5%- See Figure 4
 - Note: Unscheduled process down time has increased due to more frequent changeovers and running more difficult product grades.

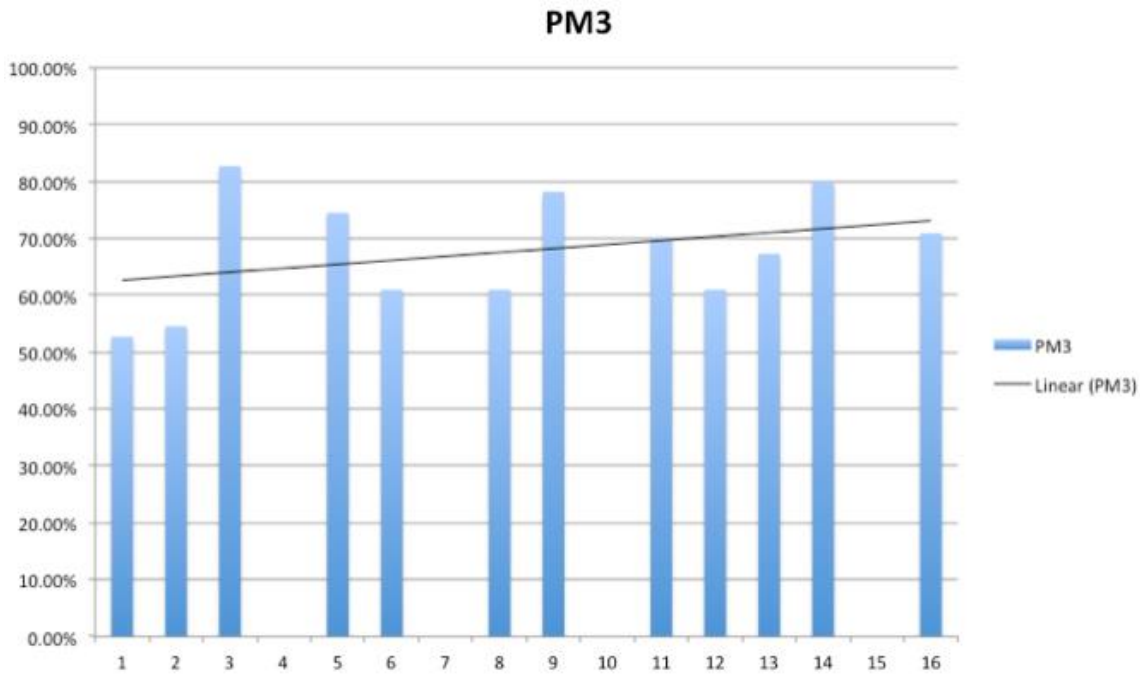


Figure 2: Shutdown Critique Score trend

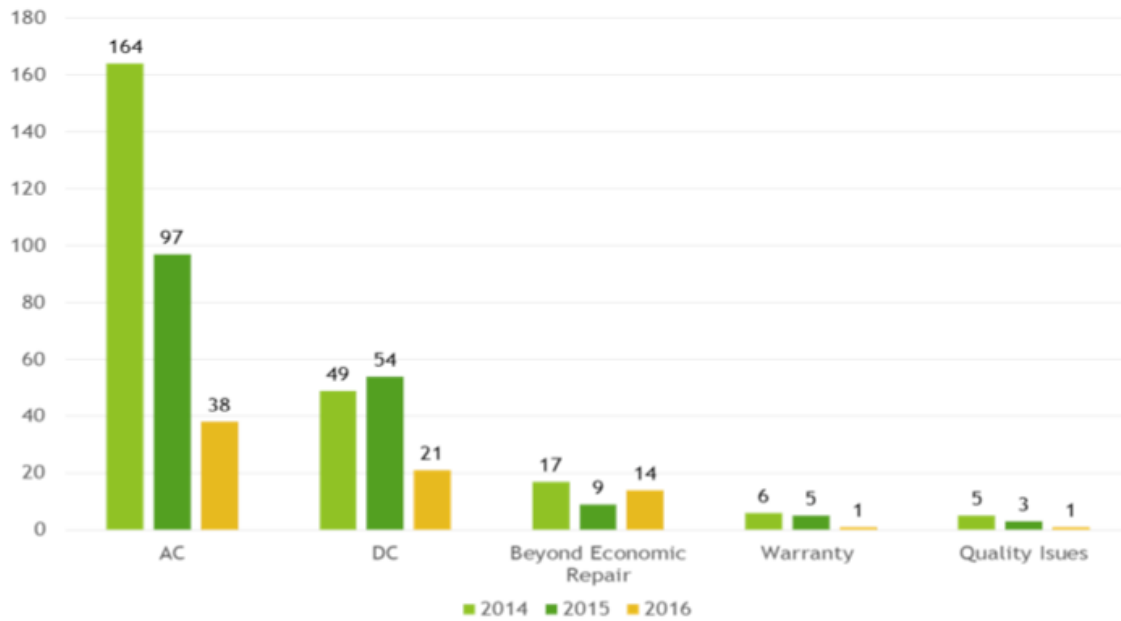


Figure 3: Motor Breakdown Rate

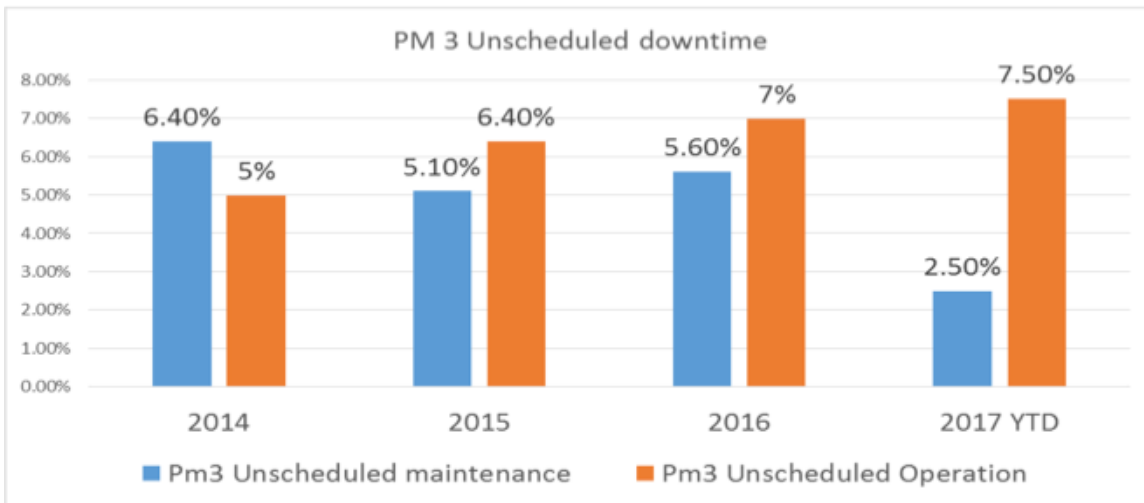


Figure 4: Unscheduled Downtime PM3. Note! Operational downtime has gone up because they are running more products on the machine today (boil-outs etc).

How Results Were Achieved

Summary

- IDCON performed a Current Best Practice (CBP) assessment to educate and help the organization visualize the reliability gaps.
- We jointly worked out a detailed implementation plan.
- We initially focused attacking the bad acting equipment and started to work on improved preventive maintenance and cleaning. This involved operations and maintenance.
- High focus on implementing best practice work management, planning and scheduling processes.

Preventive Maintenance/Essential Care & Condition Monitoring (PM/ECCM)

- Operators and maintenance personnel were trained in PM/ECCM.
- Updated PM/ECCM documentation for inspections and operator essential care.
- Set cleaning standards for equipment with a focus on hydraulics
- All PMs were reviewed; some PMs were removed and others added as needed.

Planning and scheduling

- A best practice process workflow was developed for P&S routine work.
- Planning and scheduling Best Practices training was provided to all planners, operations and maintenance supervisors.
- Planners estimated work on a daily basis and assigned work according to manpower available. Planner generated approximately 50-60 work plans a month – See Figure 5
- We jointly defined roles & responsibilities.
- Established KPIs. The main focus was % (e.g. weekly schedule break-in rate, PM compliance) for critical processes and initiated KPI tracking and review processes for each.
- Started planning sessions and scheduling meetings for all groups with standard agendas.
- Developed a structured, audited sustainability plan ensuring results persisted – included a sustainability scorecard – See Figure 6, for client to conduct monthly “self-checks”.

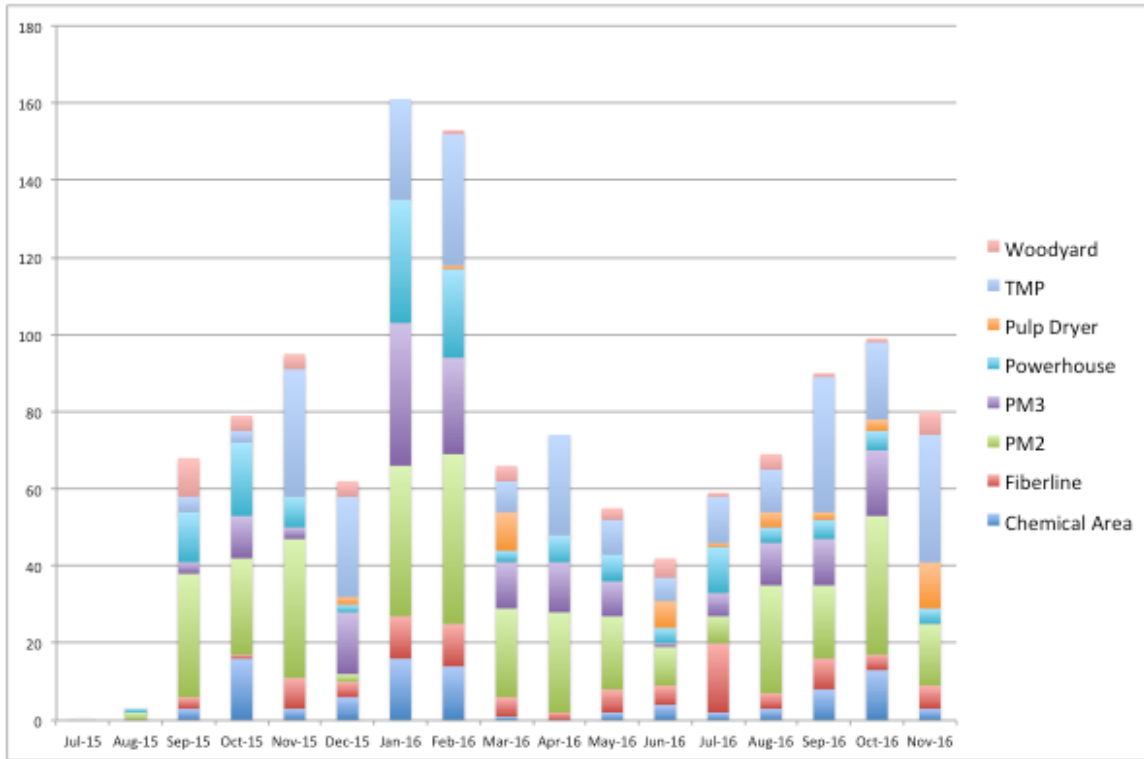


Figure 5: Planned Packages Developed by Month

Current Best Practices Implementation Score Card	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	IDCON INC
												Comments
1. Leadership & Organization	Yellow	Yellow	Green	Green	Green	Green	Green	Green	Green	Green	Green	Opportunity: Performance management, follow-up by leadership team, use of Reliability Dashboard and Weekly Schedule KPI's.
2. Preventive Maintenance, Essential Care & Condition Monitoring	Red	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Opportunity: Good documentation and route excution on front side of Mill, still work to be done in many areas.
3. Work Mgt, Planning & Scheduling	Green	Green	Green	Green	Green	Yellow	Green	Green	Green	Green	Green	Opportunity: Better utilization of OMC's to prioritize work requests and screen emergencies/break-in work. Resolve lack of OMC support in Powerhouse/Woodyard.
4. Root Cause Problem Elimination	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Opportunity: Monthly follow-up of actions by area.
5. Technical Database	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Opportunity: Technical data and BOM's not up to date in EMPAC. Organize OEM manuals.
6. Spare Parts Management	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Opportunity: Lack of progress to integrate the storeroom into the overall planning and scheduling workflow.
7. Tools and Workshops	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Opportunity: Continue to organize and clean shops.
8. Skills for Reliability and Maintenance	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Opportunity: Good training programs in place but lack equipment inspections and precision maintenance execution.
9. Engineering Interface with Maintenance	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Green	Green	Opportunity: Implement a process to use specifications for reliability when installing or upgrading equipment. Implement MOC process in all areas.
												Date: 12/20-2016 By: Owe Forsberg

Figure 6: Implementation Score Card