

Initiatives towards Obtaining a Better Customer Satisfaction

By Nur Hanim Abd. Ghani

Perusahaan Otomobil Nasional Bhd or better known as PROTON, is one of the leading automobile manufacturers in Malaysia. PROTON commands as much as 65 percent of the domestic market. Prior to its establishment in 1983, Proton has implemented steps to boost its efficiency. Some of the steps include building a new and highly automated production facility with a capacity of up to 400,000 cars per year. Its headquarters is located in Shah Alam, Selangor and operates an additional manufacturing plant in Tanjung Malim, Perak.

PROTON continues its quest to optimise product development and deliver innovative technology through collaboration and strategic partnerships.

It is one of the strategies for PROTON to reposition itself into the export market and expand PROTON's capability of providing quality products to the customers. In addition to this, PROTON also strongly emphasises on the importance of innovation in its whole production capacity. By doing so, it is expected to evoke new excitement of long-lasting motion experience to the customers.



PROTON towards innovation

Innovation plays a vital role for automakers to deliver cars of quality to the market. Three principals that drive auto industry to be innovative are regulatory mandates with respect to fuel efficiency, emission and safety; customer demand and expectations; and technological advances which enable the development of new features and reduce operations costs.¹ All these obligations have to be in accordance with the automakers' strategic business planning as this will assist them to be well positioned in the global marketplace.

As the first national car manufacturer in Malaysia, PROTON has gone through many challenges that bring this organisation to embark on innovation. The management is committed in delivering newest car portfolio in the market up to refurbishing the production line performance. Despite a challenging environment, PROTON's researchers are enthusiastic to develop new models for the next generations while all other employees are dedicated to produce cars with zero defect performance. The culture of improvement in PROTON is an element that the employees are proud of.

¹Accelerating Innovation New Challenges for Automakers, The Boston Consulting Group, 2014.



Defects occurred in the cylinder block production line

Innovation and Creative Circle (ICC) is an example of activity that encourages innovation among employees. It is an approach of cost saving through the reduction of defects and wastages that simultaneously increase work performance. In 2012, a team known as Dream had studied the possibility of increasing work efficiency in their production line. The team consists of eight members from Engine Shop, PROTON Tanjung Malim plant who are involved in cylinder block production line.

Each year, a total of 20,000 cylinder blocks are produced for delivery to engine assembly line at PROTON Shah Alam plant for the next process. The cylinder block is one of the most important components in an engine for new Saga, Gen-2, Persona, Exora and Satria NEO.

Following the target of improving work processes, a brainstorming session was held among the team members. Dream identified 18 problems that could be resolved for improvement purposes. The critical and capability matrix analysis had further made the team to conclude that the cleanliness of cylinder block after washing process of OP#16 machine was the major problem for their ICC project. It was recorded in August 2012, a total of 185 cylinder blocks were not clean after the washing process.






This was identified as the highest amount produced by the cylinder block production line. The current washing system was unable to remove excess chips and sludge. Extra rework activities were needed to deliver high quality cylinder blocks to the next stage of engine assembly. Furthermore, the defect cylinder blocks had delayed the engine assembly process which required an extra time of 85 minutes. It was estimated that the total loss for this problem was RM130,566 per year which involved time, over processing and transportation wastages.



The problem of cylinder block cleanliness was identified as the problem that required rework activities.



OP#16 machine is for washing process of cylinder block.

No	Problem		Downtime
1	Engine testing duration increase if problem occur during engine testing process		5 min
2	Workers need to record all problem happen before any repair activity can be done.		5 min
3	Process of separating cylinder head from the affected short block		30 min
4	Dismantling process of crank shaft from short block		20 min
	Dismantling process of cylinder piston from short block		25 min

An extra of 85 minutes was needed for rework activities due to cylinder block was not clean after the washing process.





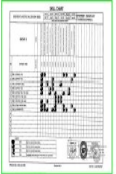




Accelerating innovation through ICC project

At PROTON, it is believed that all employees are capable in contributing ideas for betterment. The employees' involvement in ICC has accelerated innovation as more inefficiency problems are resolved tremendously with high achievement in cost saving. Dream continuously supported the members to be innovative by through the structural approach of ICC project.

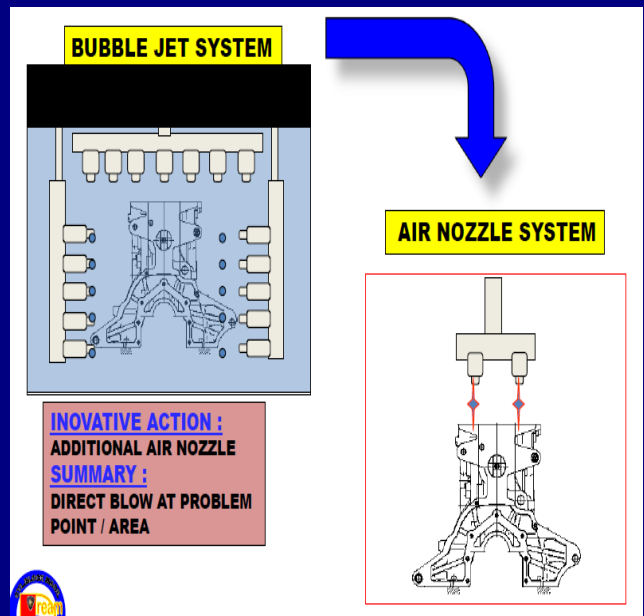
The Fishbone diagram was used to identify the root causes before implementing any solution. Lack of maintenance on OP#16, new operators with limited skills and lack of monitoring of air pressure system during the washing process were identified as the main root causes contributing to the cleanliness of the cylinder blocks after the washing process.

The team implemented three simple solutions for each causes namely establishing time schedule of machine maintenance using Total Preventive Maintenance (TPM) approach, developing training syllabus and conducting training to new operators and coming up with check-sheet for monitoring of air pressure filter condition.

Subsequently, data was collected to ensure the effectiveness of the solutions in the existing work instruction. A one-month testing period had revealed that defects still occurred amounting to 78 cylinder blocks as compared to 185 units previously. It was only 58 percent of improvement which did not achieve the zero-defect performance. The uniqueness of ICC project allows the team to review and add new solutions to meet the target accordingly. Therefore, Dream expanded the scope of research by identifying additional new solutions for zero-defect achievement.

ACTION	REASON	BEFORE	AFTER	ACTION ONGOING
FIRST TPM	THE MACHINE AFTER TPM ACTIVITY IS GETTING BETTER			
SECOND SYLABUSS TRAINING	SKILL MAN POWER IMPROVED 46.2% - 51%			
THIRD PRESSURE SETTING	PRESSURE READING CONSISTANT			

After implementing these three correction actions, defects were still occurred amounting to 78 cylinder blocks as compared to 185 units previously.



The innovation solutions of bubble jet and air nozzle systems have aided in achieving the target of zero-defect performance.

List of additional new solutions :

Root Cause	Proposed Solution	Action Taken
No specific equipment for cleaning cylinder block before washing process	In-house equipment development for zero-defect performance	<p>An equipment known as Bubble Jet System is developed and placed before the OP#16.</p> <ul style="list-style-type: none"> • Collaboration with Production Engineering Unit in designing the tool; • Accurate measurement of each hole of cylinder block were taken into consideration when developing the tool; • Air nozzle system is included in the equipment which is pointed at every hole to remove the chips and sludge at top face of cylinder block efficiently. This allowed air flow directly at the problem area; and • Booster regulator is installed into the equipment for controlling air pressure from main compressor. This installation has reduced electricity consumption.

Three improvement actions of TPM time schedule, training syllabus and check sheet monitoring as well as two innovative and creative solutions of bubble jet and air nozzle systems have aided in achieving the target. The reduction in unclean cylinder blocks achieved by the team was acknowledged by the management. The team had registered air nozzle system as PROTON's Intellectual Property (IP), indicating that this initiative is a valuable asset to the organisation. As a role model of innovation, DREAM was further instructed by the management to train three new ICC groups. This is to accelerate innovation and creative thinking among the new staff at PROTON. Thus, with the right atmosphere, approach and teamwork spirit, it is no doubt that employees could drive the company to be a world class organisation and be at par with the competitors.

Analysis of ICC project in PROTON Tanjung Malim

Previously, it was recorded that an average of 125 unclean cylinder blocks were produced after the washing process in the cylinder block production line every month. Extra rework activities were required and thus this increased operation cost to RM41,250 per month. After incorporating ICC initiatives, the team managed to obtain zero-defect performance and only 12 workers are needed as compared to 13 employees before. The monthly operation cost after ICC has reduced to 30 percent, amounting to RM12,375 per month. With no cases in unclean cylinder block, the team is able to save a cost of RM28,875 in a month. Hence, PROTON manages to save cost of zero-defect performance by RM346,500 every year.

The efficiency rate has increased to 69 percent as compared to 56 percent, indicating an improvement in work efficiency. The downtime performance before ICC was 49 percent has also improved to 31 percent. Now, no more complaint as the deliverable output has met the customer expectation. This proved that ICC project provides win-win situation to the customers as well as to the company in a long-run. ICC initiatives have succeeded in reducing operation costs and increasing work efficiency which drive towards output optimisation.

Matrix before and after ICC project:

Description	Before	After
Average unclean cylinder block (piece /month)	125	0
Operation cost (RM/month)	41,250	12,375
Total operation cost saving (RM/month)	0	28,875
Total operation cost saving (RM/year)	0	346,500
Efficiency rate (%)	69	56
Downtime performance (%)	49	31