Quality Sustainability For Creditable Saga

By Nik Rosdi Nik Yusoff

Malaysia's first national car, PROTON SAGA which was launched in July 1985 has been a companion to thousands of automobile consumers, not only due to its affordability and capacity but also because of it being a national symbol of the country. Enthusiasm and inspiration by the engineering teams have led PROTON to embrace an innovative design. In addition to that, the local technology triumph plays an intense role in bringing Saga models to reach the verge of a third generation outlook. The latest SAGA model, known as SAGA SV (Super Value) made a breakthrough in the market on 15 June 2013, almost 20 years after the introduction of the first Saga. The latest SAGA SV offers more improvised safety features and innovative designs with powerful engine performance.

The year 2014 and 2015 have been the most fulfilling years with Proton SV being awarded the debut Model of the Year for the category of 'value-for-money' for its 1.3L and other categories below that by the Frost & Sullivan Awards. Continuous improvement and effort by the employees through many team projects at Shah Alam factory premises have brought to the accomplishment by PROTON for their SAGA models.

Engaging Innovation For Quality Enhancement

The ability to create and benefit from innovation plays prominent role in driving PROTON towards quality enhancement. By doing so, all employees are encouraged to contribute ideas in getting through the national automotive industry. Not only that, innovation has led PROTON to fulfil customer expectations of quality and safety issues. Employees are learning to be better by thinking beyond the bounds of conventional ways in solving issues of quality.

PROTON uses Innovation and Creative Circle (ICC) initiatives as a platform to boost the generation of ideas and executing them. ICC drives the organisation through a more structural step, through its techniques and tools for ensuring the ultimate goal of cost saving and quality enhancement are achieved. The importance of this initiative has been regularly

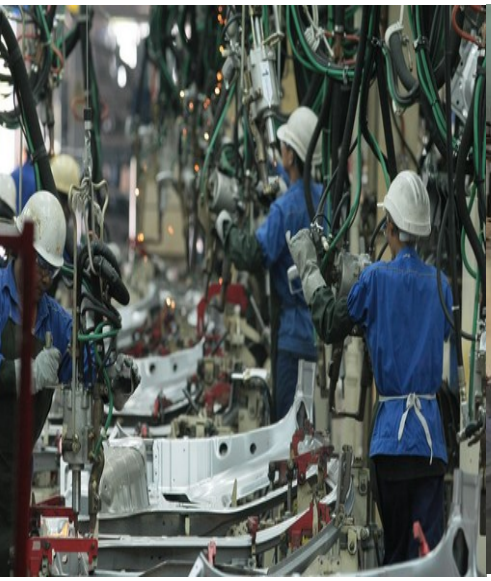
emphasised by the management at PROTON and has been embedded in one of the Key Performance Indicators (KPIs) for quality improvement. With the support and facilities provided by the management, more than 100 ICC projects have been implemented since 2006.

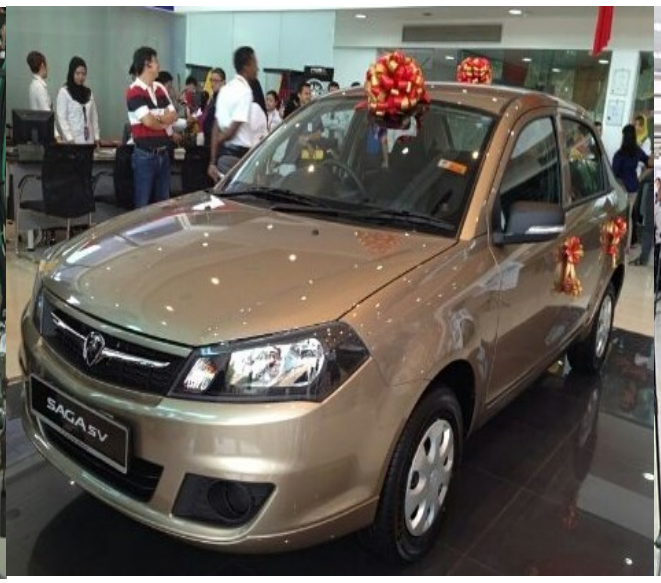
QIT Project at Production Engineering Department, Shah Alam : The SAGA Base Line Model (BLM) Assembly

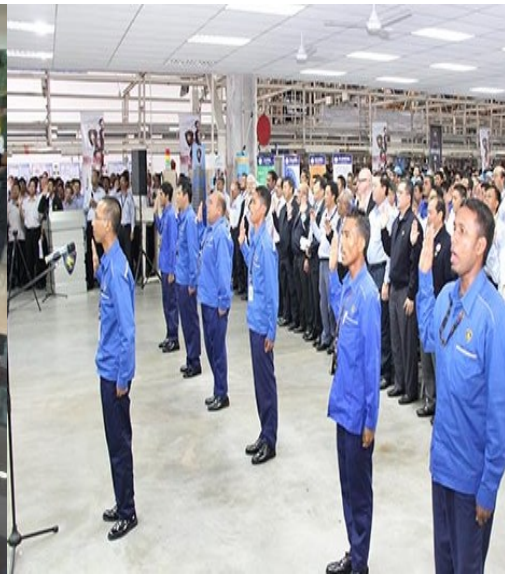
The PE BIG, a Quality Improvement Team (QIT) has an outstanding achievement in the PROTON QIT program. It was established nine years ago, to look in to the quality issues at Saga BLM model body production line. The PE BIG team which consists of eight members of a cross educational background had been involved in nine projects with the supervision of the Senior Manager. Their first project was implemented in 2007 at the Production Engineering-Body Unit. PE BIG understood the significance of continuous organisational improvement and hence initiated their ninth project in June 2014 through a forceful teamwork. Through a brainstorming session, the group came up with lists of problems in body assembly defect identified in the daily Rejection Body Assembly record sheet.

During the Weekly Quality Meeting, they came up with the Pareto diagram which tabled out the five main defective issues caused at the Final Trim Body Department. It was recorded in May 2014 that, 131 cases with highest defect were identified during the final installation of fender and hood. Fender is a component that is installed in every car that frames a wheel well while hood or bonnet is the hinge that covers the car engine. It was further deduced that the hood-to-fender gap did not meet the standard specification of 3.5±1.0 mm for both right and left sides. Therefore, the team concluded that this issue must be solved as soon as possible to improve the quality of SAGA cars.

Not only that, it was further discovered that the department only achieved 57.2 and 40 percent of front end assembly and clearance fitting accuracy fender with hood rates respectively. However, these performances did not match the department KPIs of 80 and 85 percent respectively. In addition to this, a rework time of 120 seconds per car was in need before it can be sent to the warehouse. This increased the production cost to RM58,070. Thus, the team decided to achieve a target to reduce the defect by 40 cases and Defect per Hundred (DPH) by 0.5, improve front end accuracy rate up to 85 percent and build-up quality that will contribute to the department's KPI of Body Assembly Standard.







Innovative Ideas In Problem Solution

Brainstorming activities were carried out to identify the root causes of the hood-to-fender difference gap defects. Consequently, the Fishbone approach was used to analyse the root causes and as a result, 15 causes were identified. The team then used the verification approach and decided only to concentrate on six crucial causes namely under machine, material and method categorisation. The six causes were larger gap between guide and front side member assembly, damage in bar head lamp hole, nut fender shield and upr/head lamp support assembly jig offset with fender hole, larger gap between part head lamp support with locator and heavy fender fitting jig which delayed the fender installation.

These findings gave a clearer picture to PE BIG in generating more ideas for solutions. They conducted experiments to identify the best solutions for each root cause that were identified earlier on. The table below shows the proposed solutions and action taken to resolve the issue in relations with the problem of hood-to-fender difference gap defects.

Root Cause	Proposed Solution	Action Taken
A larger gap between guide and front side member assembly	Locator front end assembly jig#2 adjustment	1. Removed plate shim 2.0mm and 1.5mm that allow guide to contact front side member
Damage in bar head lamp hole	Locator front end assembly jig#2 adjustment	2. Installed Clamper pin bar head lamp in jig#2 3. Removed plate shim 0.5mm (Y direction)
Nut fender upr	Locator Head Lamp Support assembly jig adjustment	4. Removed plate shim 1.0mm (Y direction)
Nut fender shield	Locator front end assembly jig#1 adjustment	5. Installed and removed plate shim 1.0mm (X-dir / Z dir)
A larger gap between part head lamp support with locator	Locator front end assembly jig#2 adjustment	6. Installed plate shim 1.0mm (Z dir) – upward and downward
Heavy fender fitting jig which delayed the fender installation	New fender fitting jig	7. New concept for fender fitting jig was developed that was easy to handle by the operators. Special features included in the jig were : • weighted only 3kg as compared to 71kg previously • Eliminate 4 units of spring balancer

OVERVIEW OF THE PROJECT

Before ICC :

131 cases with highest defect were identified during the final installation of fender and hood.

Target

85%

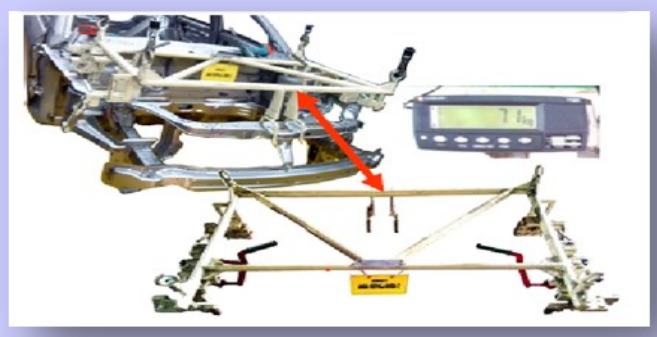
improve in front end accuracy rate

57.2%
front end accuracy rate

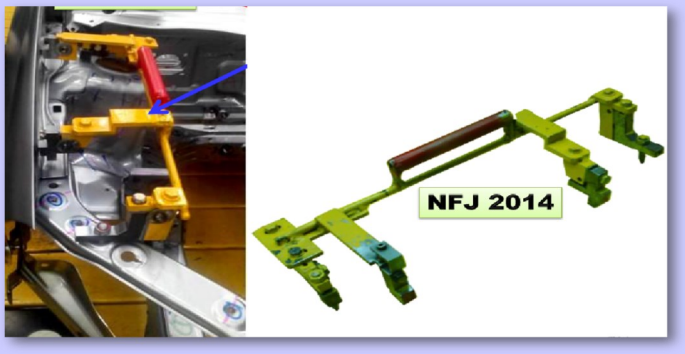
40%
clearance fitting accuracy fender with hood rate

This increased the production cost to **RM58,070**

THE BEST ICC SOLUTION : NEW FENDER FITTING JIG



BEFORE :
- weighted 71kg
- Used 4 units of spring balancer



AFTER :
- weighted only 3kg
- Eliminate 4 units of spring balancer

The in-house development of the new fender fitting jig had shown that the ICC project was able to encourage the team to create new jig which will boost the process of fender installation. This jig development needed a total cost of RM527.05 and RM384.28 for locator adjustments. The implementation of the solutions was included in the existing Standard of Procedure (SoP) which will be executed by the employees. This is one of the ways in sustaining the quality of SAGA car for optimising customer satisfaction.

Indeed, the new innovation of a fender fitting jig was applicable to all PROTON models as it was light, user-friendly and able to administer measurement dimension. It ensures workers in not straining themselves and use less force to do repair works. Ultimately, the four objectives were accomplished. The project has contributed to the organisation and has helped to impact its strategic and operational performances.

Analysis Of ICC Project In PROTON, Shah Alam

The implementation of the ICC initiatives provides a better solution in the reduction of defects during the fender and hood installation at the body assembly line. Previously, it was recorded that 131 cases of defect were produced which did not meet the standard specification of hood-to-fender gap for SAGA model. Now, with the implementation of ICC solutions, the defect cases have reduced to only one, indicating a reduction of 99 percent. PE BIG is able to achieve the department's KPI of front end assembly and clearance fitting accuracy fender with hood rates. This has brought to an improvement of 87.5 percent and 80 percent respectively. Before this, the operators were only able to deliver 57.2 percent and 40 percent. In addition to this improvement, the operators are not required to carry out rework and repair activities as compared to 120 seconds per car required previously.

The DPH has also improved to less than 0.5 as a result of reduction in defect cases. This achievement has led the team to save a cost of RM57,160 per year. The investment cost for this project was only RM910. Now, there are no more complaints as the deliverable output has met customer expectation. In terms of intangible benefits, the ICC members were satisfied with the cooperation in making the project a success. Consequently, their self-confidence, computer skill and the understanding of ICC tools are upgraded in which will assist them to be better in the future. Thus, ICC initiatives have not only succeeded in reducing cost and boosting work efficiency, but also is able to equip employees with the spirit of teamwork and capacity building.

COMPARISON BEFORE AND AFTER ICC IMPLEMENTATION

Number of defect cases:
Before : 131 cases
After : 1 case

Front end assembly accuracy rate:
Before : 57.2%
After : 87.5%

Clearance fitting accuracy fender with hood rate:
Before : 40%
After : 80%

Rework activities per car:
Before : 120 seconds
After : 0

Defects per hundred:
Before : 2 DPH
After : 0.5 DPH

Investment cost:
Before : 0
After : RM910

Cost saving per year:
Before : 0
After : RM57,160