

# Case Study



Automotive Industry Development Centre

## Tenneco Clean Air TPM Cluster Programme



### Company Background

Gillet Exhaust Technologie (Pty) Ltd was founded by Gillet GmbH in 1993 and purchased a year later by Tenneco Inc. The company expanded, together with the construction of a green fields factory and a new legal entity, Tenneco Automotive (Pty) Ltd, was operational in 1998.

The company trades under the name “Tenneco Clean Air” and is part of Tenneco’s European operations. Tenneco Clean Air serves Original Equipment Manufacturers and the aftermarket both locally and internationally, with a large majority of its goods exported.

### Key Challenges Faced (Why was TPM chosen?)

Tenneco CA joined the AIDC TPM Cluster programme to reduce unplanned downtime by improving the reliability, availability and maintainability of their equipment and tooling. TPM will be used as a support system to the current maintenance program, in making both the shop floor and maintenance responsible for the up keep of expensive equipment. TPM was chosen as a tool to countermeasure poor OEE, as well as obtain total shop floor involvement in continuous improvement activities.

### Goals

The main objective of the programme is to focus on four TPM pillars; Autonomous Maintenance (step 0-3), Focused Improvement, Planned Maintenance and Quality Maintenance.

### Overview

**Company:**  
Tenneco Clean Air

**Location:**  
Cnr Libertas & Struanway Rd,  
Struandale, Port Elizabeth

**Number of employees:**  
574

**Core products:**  
Catalytic converters, Downpipes,  
Cold End System Assemblies

**Core processes:**  
Bending, robotic welding, catalytic  
converter canning, hot rolling

**Percentage of goods exported:**  
98.23%

**Programme period:**  
July 2013 – July 2014



## Tenneco Clean Air TPM Cluster Programme



Figure 1: Deep cleaning exercise – Autonomous Maintenance step 1.

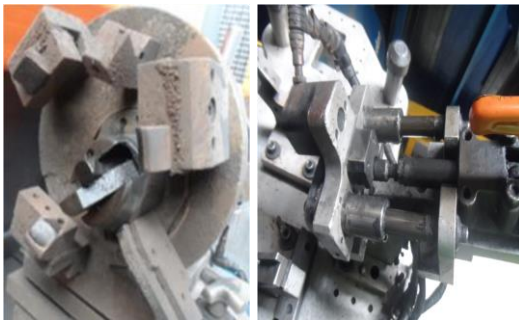


Figure 2: Identifying sources of contamination – Autonomous maintenance step 1 and 2.



Figure 3: Team member Kaizen training – Focused Improvement step 2.

### Programme Journey

Tenneco Clean Air (CA) joined the TPM Cluster programme in July 2013. The TPM champion, Anton Emiljo, is the Continuous Improvement Manager, while the TPM pillar leaders consist of Lean Leader, Shawn Myburgh (Focused Improvement) and Maintenance Co-ordinator, Johan (JP) Viljoen (Autonomous Maintenance).

Tenneco CA chose Mercedes EOL 1 as the TPM model area, which is also their Tenneco Manufacturing System (TMS) cell, in which all improvements are implemented before being rolled out to other areas in the plant.

Autonomous Maintenance (AM) training for Step 0 and Step 1 was conducted for both the pillar team and the shop floor, focusing on initial cleaning in the model area. A tagging procedure was developed to clarify the responsibilities of both production and maintenance in the tagging process.

Cleaning standards and single point lessons have been developed for the model area. The team members have also been trained on the TPM documents and conduct the cleaning exercise daily.

Tenneco CA was audited for AM Step 1 and passed with 83%. The TPM team ensured the continuation of the TPM activities, by developing/conducting the following processes:

- ✓ A special siren goes off ten minutes before shift end, to alert team members of the ten minute cleaning time,
- ✓ Audits are conducted by the pillar team to verify that the cleaning takes place daily.

## Tenneco Clean Air TPM Cluster Programme



### Before



Figure 4: Tags were displayed according to empty, raised and logged tags.

### After



Figure 5: Tags are displayed visually per machine.

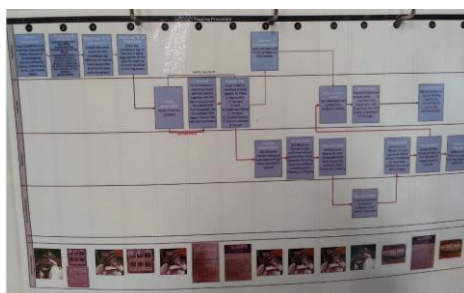


Figure 6: Swim lane used to easily describe and display the responsibilities in the tag process.

### Autonomous Maintenance Step 2

Tenneco CA is currently in step 2 of Autonomous Maintenance. Training for AM step 2 was conducted for the shop floor, including training on the 7 QC tools, 7 wastes and Kaizen developments.

Focus has been placed on the reduction and elimination of sources of contamination and hard-to areas. The cleaning standards have been modified to include inspection and further single point lessons have been developed for the model area.

The TPM team has made the following improvements to the TPM activities:

- ✓ Tag process – Tenneco CA has developed a process that clearly identifies the roles and responsibilities of each member in the tagging process, i.e. the responsibility of the team members, team leader and maintenance personnel in logging and closing out of tags. A swim lane has also been developed for training purposes and ease of use. The tag board has been improved by separating each section of the board according to the individual machines in the model area. This allows a three second glance at which machine has the most tags,
- ✓ Weekly 1-hour TPM sessions – the model area is stopped for one hour each Friday to allow deep cleaning to take place, as well as provide time for Maintenance to address TPM related issues in the model area. These maintenance activities are planned and discussed at the TPM weekly meetings every Thursday afternoon,
- ✓ Andon improvement – Tenneco CA improved their andon system for alerting team leaders of line issues. The initial andon consisted of a siren and flashing lights. The improvement was made for instances when the team leader had still not arrived after an awaited period. The team members are now able to send an SMS to the team leader via the on line PC, alerting them of the problem and reducing waiting time.



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Figure 7: Weekly 1-hour TPM sessions – used by team members for deep cleaning and maintenance personnel to address tags.

## Progress plan for AM step 2

TPM PILLAR STATUS TIMING PLAN - MERCEDES EQ L1					
STEP 2	INTRODUCTION	DOCUMENTATION	PROCESSES & TRAINING	TOOLS	AUDIT
AUTONOMOUS MAINTENANCE	Shop floor training - step 2	Sources of contamination list - updated List by floor - updated Cleaning standards - updated & reduced Tags - for step 2 Loss map	Check JAM board is up to date Check tagging process is in use Check cleaning before plant starts shift Shop floor training - new SPLS Shop floor training - revised cleaning standards	Machine demarcation - senses	Pre-audit Audit
FOCUSED IMPROVEMENT	Shop floor training - 7 QC tools & 7 wastes	7QC matrix - updated Kaizen sheets - sheet from the shop floor Kaizen sheets - improving the 6 big losses Kaizen sheets - improving/eliminating sources of cont Kaizen sheets - improving/eliminating hard to access	Check 11 board is up to date Kaizen training - shop floor Kaizen practical session - shop floor Production studies - 6 big losses and pareto analysis Change overs Kaizens linked to OEE improvements	Speed for shop floor Kaizens - Options	Pre-audit Audit

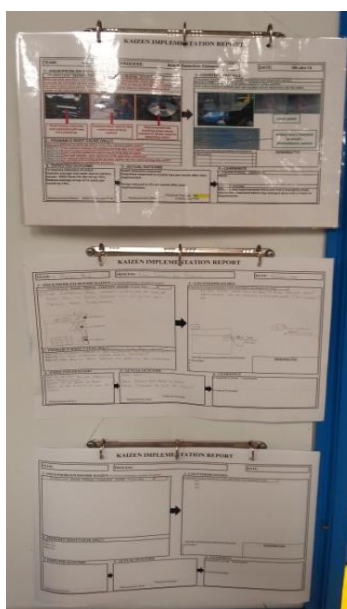


Figure 8: Kaizen board implemented for shop floor Kaizen ideas and exercises. The board contains empty, in-process and completed Kaizen sheets.

## Sustainability (What can be done from AIDC's viewpoint?)

Once the 12 month period has elapsed, the Pillar heads of the TPM team will continue to conduct regular audits in terms of Autonomous Maintenance, Focused Improvement and Planned Maintenance, to ensure that the TPM standards are kept in place.

## Way Forward

Tenneco Clean Air has commenced with the horizontal deployment of TPM to the Jaguar DW12 line. The Jaguar line is currently in step 1 of Autonomous Maintenance. The company plans to roll out the TPM programme to the Ford DW10F area next.

### CONTACT DETAILS

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