CASE STUDY

TPV Šumadija

“The UNIDO Programme contributed a great deal to increase the volume of knowledge and to implement the improvement method, the way and method to satisfy demands of technical specification ISO/TS 16949, as well."

AC Serbia in cooperation with the Auto-Cluster Slovenia

ACS Automotive Cluster of Slovenia Slovenski avtomobilski grozd

Overview

Location: Kragujevac, Serbia
Manufacturing activity: Production and turnover of parts for small motor vehicles
Core products: Engine gaskets production
Programme period: Oct. 2008 - Oct. 2009
Number of employees: 98 (59% women)
Average annual turnover (or sales): 2,500,000 EUR (sales)
% of goods exported: 90%

Background

TPV Sumadija forms part of the TPV group with headquarters in Novo Mesto, Slovenia. The car industry in Novo Mesto was formed in 1954 with the company Moto Montaza. Auto Montaza in cooperation with the company Autounion from Düsseldorf founded the company IMV, producing its own commercial vehicles. In 1989, some independent companies were formed from IMV, from which TPV originated. In 2005, TPV established its own firm in Kragujevac called TPV Sumadija.

TPV Sumadija is a leading manufacturer of parts and components for Renault, BMW, Bosch, Cimos, and other renowned international car manufacturers. The company is located in the heart of Serbia – the Municipality of Kragujevac. The firm produces seats for motor vehicles (passenger, freight and tractor vehicles) and stamping parts from sheet metal for passenger cars. The majority of TPV Sumadija's exports go to European countries (60%), the Middle East (20%) and Northern Africa (20%).

TPV Sumadija holds an ISO9001 certificate and intensively works towards the introduction of TS16949.

Before TPV Sumadija joined the UNIDO counseling programme, its management had a quite good understanding of continuous improvement processes in general (primarily related to product quality). However, this knowledge was only visible within management circles and did not trickle down to the workers and to actual shop floor processes. Furthermore, there was a dearth of expertise on other issues such as environmental management or the handling of waste more specifically.

The Challenge

TPV Sumadija expressed its interest in being included the UNIDO Counselling Programme, as its management realized that the suggested approach was exactly what they were lacking at that time. The firm faced high PPM (in process rejections) and did not know how to improve this.

When the company started operations, TPV Sumadija rented a space on the premises of the old Zastava plant. However, in mid 2008, the firm decided to move to a new plant in the industrial zone (Industrial Zone Service II). This move did not only bring along a series of challenges but also opened opportunities within the UNIDO programme, since the firm could reap the benefits from applying lean management tools from the very beginning and integrating these concepts already in the phase of defining the new floor plan and machine set-up.

1. High defect rates and low productivity:

At the beginning of UNIDO counseling programme the company had to face defect rates of 2.01 (defects/entire production). The overall productivity was only 60%, measured based on the difference between projected technological time and real production time. In other words, the company produced 81 parts in one hour. The low productivity was mainly a result of the recent move of TPV's production to the new facilities, which resulted in a series of challenges, including the following:

Materials and semi-finished products were lying around on the shop-floor and were not organized properly: As a result, employees lost a lot of time to search for tools and parts they needed for their work, which in turn impacted negatively on their motivation and working atmosphere. Because of such an unorganized workplace situation the productivity of everyone suffered.

- Lack of visual standards in process and activities: At the beginning TPV did not dispose of any visualization tools or standards in the new location. There is clear evidence that without proper visualization, workers always loose time to make sure that they are on the right track (doing their job in the right way) and to cross-check that the products they produced are correct and without defects.
- Written procedures were not appropriate for the new facility: When the company assumed production in the new location, the written procedures in place still described processes as if they were taking place in the old facility and where therefore inadequate. As a consequence, TPV's employees did not understand the entire production circle properly and only focused on isolated steps in the whole process. In situations where the big picture is missing, productivity usually suffers and the probability to cause defects is increases. There was hence an urgent need to rewrite TPV's procedures and outline clearly who is responsible for which parts of the cycle, while conveying a good understanding of the whole process to each and everyone in the company.
- Inadequate placement of packaging-line machines, which slowed down the time for packaging (2.04 min/piece)

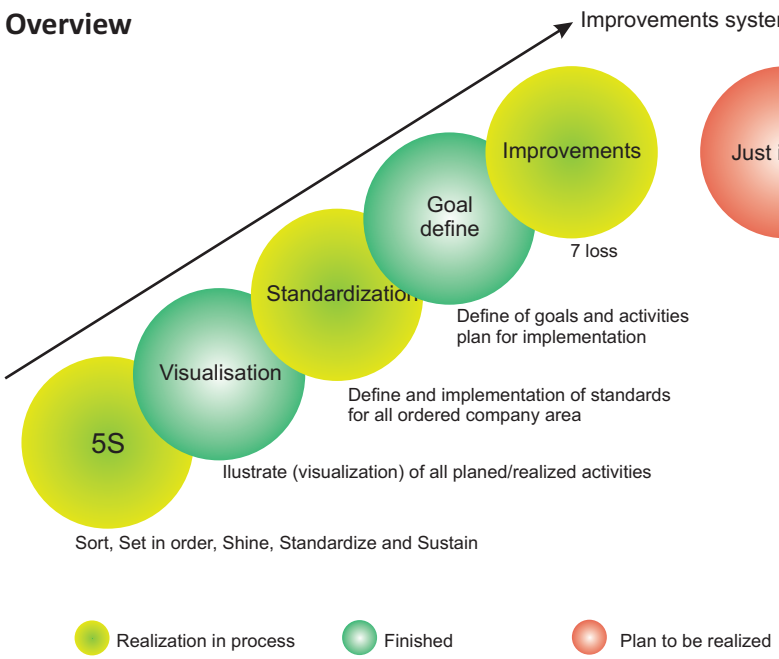
2. High costs associated with waste disposal and handling:

At the production start at the new TPV plant, the company did not assign any special location to place scrap. Therefore employees just dumped it somewhere around the facility and neither separated, nor classified it. As a result, it could not be sold and the firm lost a potential additional source of income. After proper analysis with the counselor, it was found that TPV always produced 3 types of scrap and management hence decided to assign three particular zones with boxes for each type. After having separated and classified the scrap the company was able to sell it and thereby earned around EUR 30,500 in 2009 of additional income.

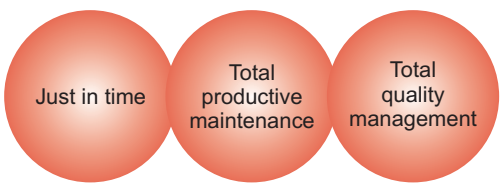
The Goal

To optimize the producing process on the new location to satisfy the requirements of the car industry of today and to introduce enhanced environmental management practices.

The UNIDO Programme / Process and Tools Applied



„Road map"



In September 2008, a memorandum of understanding was signed with TPV Sumadija stating all working/cooperation modalities and techniques/methods to be applied in the company. The training cycle for management and employees started on 1 October 2008 with a joint meeting and training session for all firms that decided to participate in the UNIDO upgrading programme.

At the very outset, a company focal point (person in charge of the coordination of the UNIDO programme - Ms. Gordana Vasiljevic, Quality Manager) was appointed. In cooperation with this person, a work-plan with concrete milestones, timeframes, performance indicators and responsibilities was elaborated.

Training

The individual company counseling continued with shop-floor trainings in the factory, whereby the UNIDO counselor visited TPV every 20 days to go through following topics with workers and managers:

a) Formation of working groups (mini-teams) in the company

Three working groups were formed (ODE1 - Elastomer, ODE2 - Kemija, and ODE3 – Prebiranje) for the implementation of 5S activities on the workplaces, where these groups were located. In addition, a Team Leader was assigned to each group. The counselor explained the key process indicators and how each group should follow them.

b) 5S implementation process (to establish and maintain order and cleanliness)

At the start of programme the UNIDO counselor provided training on the 5S method for better workplace organization and helped the teams to establish a time schedule for the implementation of this technique. All working groups started with the first “5S-step” (SORT) to identify what items they really needed for their work and which ones were redundant. The groups applied the “Red Tag” strategy to help them decide what tools or items were really necessary to be in at a certain workplace. All employees had the task to stick Red Tag cards on any equipment, tools or other items they deemed unnecessary at a particular place in the factory. All Red Tag cards were filled with the following information: description of the item; quantity; type (e.g. machine, machine spares, raw materials/finished products); reason for being unnecessary (excess, obsolete, not working, not for this section); proposed action (repair, shift to another department, scrap, relocate); and responsibility. After having completed this Red Tag campaign, the management of TPV Sumadija decided what to do with all tagged items and the proposals outlined on each card.

What followed was the second 5S step (SET IN ORDER), which implied that all items that were actually identified as absolutely necessary on each workplace were rearranged for easy use and handling based on the philosophy “a Place for everything and everything on its place”.

After 3 months of going through the counseling programme, the working groups in TPV moved to the third 5S step (SHINE), which refers to maintaining cleanliness on the workplace. This technique was implemented without major hurdles throughout the company because TPV's management greatly supported the counselor in this process.

This was crucial, since often times the counselors have to deal with employees who are convinced that such method is not applicable to their company or work places. Some typical resistances faced in this context include:

- "We don't have time for this, we have to work/produce"
- "Why cleaning? It will get dirty again"
- "Can somebody else do it instead of me"

In order to deal with such resistance from the very beginning all zone/team leaders were alerted about this potential challenge during the trainings and received guidance on how to solve such situations (e.g. by giving workers more chances to improve their workplaces and feel comfortable in this process, by comparing working places within the company – competition, or by rewarding the best arranged and cleanest zones)

c) Visualization aspects to facilitate workflows and prevent accidents

In parallel to the implementation of 5S, TPV Sumadija with the support of the UNIDO counselor started to put in place a series of visualization tools and signs throughout the company premises. In this phase, notice boards were placed in every facility with clearly outlined plans, visions, standards, directions, production results and current activities.

VISUALIZATION examples

Board

5S Information

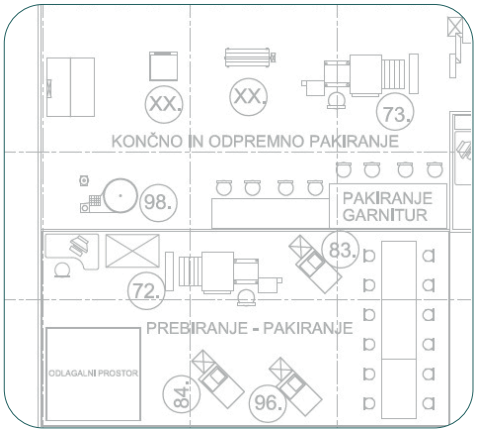
Fire Exit Direction

Working Group Presentation

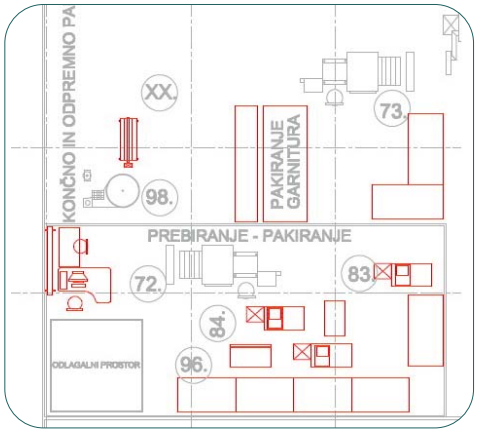
Quality Police

Strategy

Packing machines layout - Before



Packing machines layout - After



The following techniques and methods were also introduced on different occasions to complement the training programme:

- Just in time (JIT)
- Overall equipment effectiveness (OEE)
- Kan Ban (production supplying)
- SMED (quick exchange of tools and work)
- Poka Yoke (automatic mistakes prevention)
- The Other systems JIT-TPM

In addition, an analysis of the machine layout/disposition and production lines was carried out. Since the packaging took too long, the improvement teams decided to rearrange packing machines based on the recommendation of the counselor.

Results and Achievements:

1. Defect rates and productivity:

In one year, the defect rates of produced good decreased from 2.01 (October 2008) to 1.24 (November 2009), while productivity rose from 60% to 85% over the same period of time. At the beginning of the programme, the production/hour was 81 pieces and after one year increased to 113 peaces/hour.

Due to the implementation of 5S, the company managed to free additional free space of 280m^2, which they now use for a new production line (TPV planned install new machines and start producing other small parts for car seats to sell to OEMs in the future).

5S also significantly improved the work place, which in turn resulted in higher productivity and less defects.

For all processes and machines the company now has written quality procedures in place and many processes are properly visualized, which resulted in a significant decrease in PPM in process.

After having relocated the machines in the packaging line, the process became much faster - before it took 2.04min/piece, afterwards only 1.39min/piece.

Through the proper organization of scrap and its separation, TPV managed to earn more than 30,500 EURO for sale.

Area	Before	After
Percentage of Employee Involvement : 5S (1S/2S) Safety	 *9%* *1*	 *100 %* *7*
Free space after 5S (m2)	*0*	*280m^2*
Number of documented Kaizens	*9*	*18*
Customer return - PPM	*73*	*0*
Accident Frequency	*8*	*5*
Training days per year per employee	*0*	*6*
Water consumption	*824m3*	*652m3*
Energy consumption	*559 000*	*480 000*
PPM - process	*4,669*	*1,176*
Number of new customer		*2*
Certifications	*ISO 9001*	
Number of employees	*50*	*98*

Before - After Photos

	Area			
Before				
After				

The Way Forward

TPV Sumadija plans to continue with the implementation of the continuous improvement techniques, because it has proven to be very useful for the company, and did not require huge investments.

Specific future targets for the next 2 years are (by the end of 2011):

- Cutting down the expenses of non-compliance from 1.24 to 1
- Production of min. 5 new products for Tier- 1
- Increase employee motivation for bigger participation in the process of improvement (1 improvement per employee in 2010 and 2 in 2011)
- Certification of quality according to the technical specification ISO/TS 16949

Inclusion activities aimed at the elimination of dangerous substances and materials

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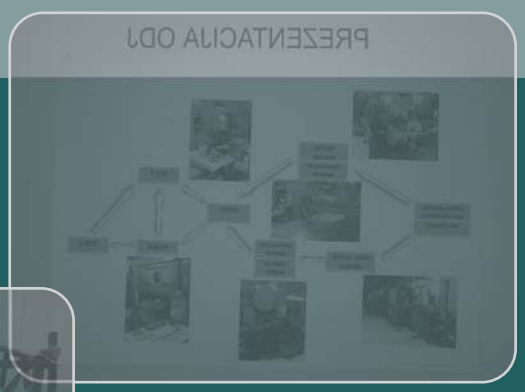

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