

The Importance of Insuring Document Quality during the Process of Motor Vehicle Repair

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Abstract — The objective of this scientific paper is to show how important it is to have a correct management of the processes that unfold in the after sales department within the service rendering organisations in the motor vehicle repair industry that have implemented a quality management system. Research has shown that insuring the quality of the services rendered to the customers begins with the quality of the product, which is, of course, first and foremost insured by the manufacturer. In return, the manufacturer needs quality information from his representatives who insure the maintenance of the product on the market. Without this feedback, correctly collected and transmitted the manufacturers' odds to insure the presence of quality products on the market is reduced to a minimum. All this information is managed through the documents which are drawn up during the motor vehicles' repair process, starting from the moment the customer turns to the organisations' services and ending with the feedback obtained from the customers after billing, in reference to service and product quality which he benefited from. During each step of this complex process, the value of the product and the service rendered need to be added.

Index Terms — Quality, Quality Management, Process, Feedback

I. INTRODUCTION

In a motor vehicle workshop service if the work scheduling is not judiciously done, technicians will not have any work for a period of time or they will be forced to work under pressure caused by not meeting the finalisation of the agreed interventions deadlines in the moment the

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motor vehicle is brought to the shop.

It is obvious that generating such a situation will determine the organisations' customers to feel unsatisfied.

Managers' role, at any level of the organisational structure, needs to be that of focusing on the quality of the services rendered even though they are tempted to focus more on the commercial and financial elements which seem to generate more visible earnings.

Philip B. Crosby proved in his works that "everything needs to be done right the first time and every time" and that "quality doesn't cost – non-quality is what costs".

II. CASE STUDY

The quality of the service processes in the organisations, which have implemented a quality management system, represents the element that lies at the basis of the structure necessary for insuring the performance level laid out by the organisation.

Within the motor vehicle repair service rendering organisation, the current management concept is based on three distinct elements, namely activities (as part of the processes), human resources (employees that manage the processes and execute the actions within the structure of the processes) and the knowledge the staff possess or acquire through permanent training.

In order to have an efficient management system it is necessary to accomplish within the organisation the cohesion of the organisation, coordination, administration and, last but not least, leadership processes.

In order to point out the ways to eliminate lost caused by delays occurred during the service process, a service work has been monitored starting with handing the motor vehicle over by the customer and ending with the moment in which the customer picks up the motor vehicle from the service.

In general the servicing activity is a complex process (Fig. 1, which can be taken apart in this manner:

- programming quality;
- quality in preparing the service work requisite and reception quality;
- reception and pre-diagnosis process quality;
- diagnosis quality;
- motor vehicle repair quality;
- quality in the execution and in insuring the final control;
- quality in billing (duration of billing process, diversity in payments modalities);
- quality in after billing feedback;
- quality in handing over the motor vehicle;
- quality in client relations management.

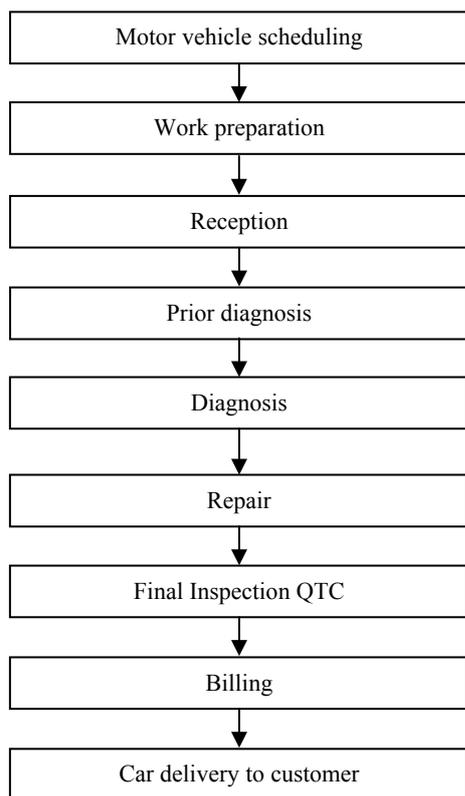


Fig. 1. General presentation of the service process

Most of the time, the technician is overwhelmed by both the complexity of the documents that need to be drawn up during the motor vehicle repair process and the interaction with the other employees who assist him (receptionist, workshop chief, technical consultant...).

This can cause lack of responsibility, which he has according to his job description.

The consequence of these events makes following regulations by the technician more difficult, the impossibility of motivating him to reach the objectives regarding quality, cost reductions or meeting deadlines, objectives which he treats reservedly, without taking responsibility for them.

III. RESULT ANALYSIS AND DATA INTERPRETATION

Monitoring the time related to executing a service intervention is presented in table I – the execution of a major technical inspection (Type B) for a Mercedes-Benz E 220 CDI.

The colour coding specific to time indication in Table I is as follows:

- red – unproductive time;
- yellow – unproductive time which does not effectively influence the technicians work only the waiting time for the customer;
- green – technicians productive time;

The graphic representation of the time afferent to the service intervention necessary for the technical inspection execution is presented in Figure 2 (which is a capture made by a software in which the case study had been done).

One can see that the longest times are not the times in which the technician actually works on the motor vehicle but the auxiliary times in which the motor vehicle is taken in, in which it clocks in and the time in which the motor vehicle is taken into the workshop

A graphic representation of the effective time in which the technician actually works on the motor vehicle is presented in Figure 3 (which is a capture made by a software in which the case study had been done).

After analysing the data presented in Table 1 and the graphic representations in Figures 2 and 3 one can see that the technician lost, for example, 8 minutes because the diagnosis APPARATUS was not in the area of the EXPRESS SERVICE work post.

The technician worked effectively for 74.5 minutes while the motor vehicle was in service for 124 minutes.

The waiting time afferent to the customer rose with 12 minutes because the motor vehicle had to be moved in the service workshop for the electronic testing and the final quality control.

The study showed that the motor vehicles' presence in the service can be reduced with 49.5 minutes, which would mean a 40% decrease of the waiting time for the customer.

IV. CONCLUSIONS

Each organisation has to have under permanent observation the processes, which unfold within each department. The processes related to motor vehicle repairs can be managed just like the motor vehicle manufacturing processes by inserting jidohka devices (which preventively stop the working car when an anomaly occurs), inserting poka yoke devices (which will stop you from making a mistake), inserting Andon devices (distance electronic audio-visual signalling systems) and last but not least, 'pull' type production. Andon represents a distance electronic audio-visual system, which signalizes the functioning way afferent to equipment or the functioning state specific to a process.

The most common Andon devices have three coloured areas (red, green and yellow). The colour code is similar to that used with traffic lights.

- green means everything is working normal;
- yellow (followed by an intermittent audio signal) means that there is a problem which requires special attention (the motor vehicle has been lifted to the maximum height, the inspection intervals monitoring system, tyre pressure monitoring system, direction change over the full line or while another vehicle is near and is engaged in an over passing, drivers tiredness monitoring system);
- red indicates a crisis situation, abnormal (breaking system damage, motor oil level monitoring system...).

TABLE I
 SERVICE INTERVENTION TIME MONITORING

Time category	Type B INSPECTION for MERCEDES-BENZ E220 CDI	Hour	Min.
unproductive	SCHEDULED	8,00	0,00
unproductive	CUSTOMER ARRIVED AT SERVICE	10,50	10,00
unproductive	RECEIVED - RECEPTIONIST	10,54	4,00
unproductive	ENTERED EXPRESS SERVICE - RECEPTIONIST	10,56	2,00
productive	LIFTED ON JACK – MECHANIC/START	10,58	2,00
productive	VIZUAL CHECK	10,59	1,00
productive	MOTOR SHIELD DISMANTLING	11,00	1,00
productive	CV SHIELD DISMANTLING	11,02	2,00
productive	MOTOR OIL PLUG DISMANTLING	11,04	2,00
productive	OIL FILTER DISMANTLING	11,08	4,00
unproductive	IN THE WORK SHOP – MECHANIC WENT TO PARTS MAN IN THE WORK SHOP	11,09	1,00
unproductive	DISCUSSION WITH CRISTI C. 810107 – CALLED BACK BY THE WORK SHOP CHIEF	11,10	1,00
unproductive	CLOCKING AM – not a clocker at EXPRES SERVICE	11,11	1,00
unproductive	STORAGE – PARTS – PARTS HAVEN'T BEEN BROUGHT	11,15	4,00
unproductive	COME BACK TO SERVICE EXPRESS – SHOULD NOT HAVE LEFT FROM EXPRES LOCATION	11,16	1,00
productive	OIL FILTER ASSEMBLING	11,18	2,00
productive	MOTOR OIL PLUG INSTALLED	11,20	2,00
productive	STEARING/SUSPENSION CHECK	11,22	2,00
unproductive	IN THE WORK SHOP – TOOLS –SHOULD NOT LEAVE AFTER TOOLS (LONG TUBULAR IMPACT FOR TYRE TAP BOLT PISTOL	11,23	1,00
unproductive	RETURNED FROM THE SERVICE WITH THE TOOL (IMPACT TAP BOLT)	11,23	0,50
productive	FRONT RIGHT TYRE DISMANTLING	11,24	1,00
productive	PL FRONT RIGHT BRAKE CHECK	11,26	2,00
productive	FRONT RIGHT TYRE ASSEMBLY	11,28	2,00
productive	BACK RIGHT TYRE DISMANTLING	11,29	1,00
productive	BACK RIGHT PL BRAKE CHECK	11,29	0,50
productive	BACK RIGHT TYRE ASSEMBLY	11,30	1,00
productive	TYRE PRESURE CHECK + CORECTION	11,34	4,00
productive	MOTOR CAP DISMANTLING	11,35	1,00
productive	POLEN FILTER DISMANTLING	11,37	2,00
productive	POLEN FILTER INSTALLED	11,39	2,00
productive	FUEL FILTER DISMANTLING	11,40	1,00
productive	FUEL FILTER INSTALLED	11,42	2,00
productive	MOTOR OIL COMPLETION	11,43	1,00
productive	AIR FILTER DISMANTLING	11,44	1,00
productive	AIR FILTER INSTALLED	11,47	3,00
productive	MOTOR OIL COMPLETION	11,50	3,00
productive	ANTIFREEZ SOLUTION CHECK	11,51	1,00
productive	AGGREGATE BELT CHECK	11,52	1,00
productive	MOTOR OIL LOSS CHECK	11,53	1,00
productive	MOTOR STARTING/STOPING	11,54	1,00
productive	LIQUIDES LEVEL CHECK	11,54	0,50
productive	MOTOR CAP INSTALLED	11,55	1,00
productive	GEARBOX SHIELD INSTALLED	11,58	3,00
productive	MOTOR SHIELD INSTALLED	12,00	2,00
productive	ILLUMINATION SYSTEM CHECK	12,04	4,00
productive	ORDER FILLED OUT	12,06	2,00
unproductive	REVISION CHART FILLED OUT	12,09	3,00
unproductive	FINISHED REVISION – SERVICE EXOT - RECEPTIONIST	12,12	3,00
unproductive	SERVICE ENTRY – RECEPTIONIST – because the diagnosis APPARATUS is not at the working post EXPRES SERVICE	12,13	1,00
unproductive	RESET INTERVAL – diagnosis APPARATUS	12,20	7,00
unproductive	OIL LEVEL CHECK – diagnosis APPARATUS	12,21	1,00
unproductive	ADDITIONAL – THROTTLE + LAMP - ELECTRICIAN	12,23	2,00
unproductive	SBC CHECK - ELECTRICIAN	12,23	0,50
unproductive	FINAL CHECK – WORK SHOP CHIEF	12,26	3,00
unproductive	WORK SHOP EXIT – WORK SHOP CHIEF	12,27	1,00
unproductive	ESTIMATION DRAW UP - RECEPTIONIST	12,36	9,00
unproductive	CUSTOMER PAYMENT (BILLING)	12,43	6,00
HOURS	Timed duration		Min.
2,1	INTERVENTION DURATION TOTAL(motor vehicle arrived – motor vehicle left)		124,0
1,2	MECHANIC INTERVENTION DURATION TOTAL		74,5

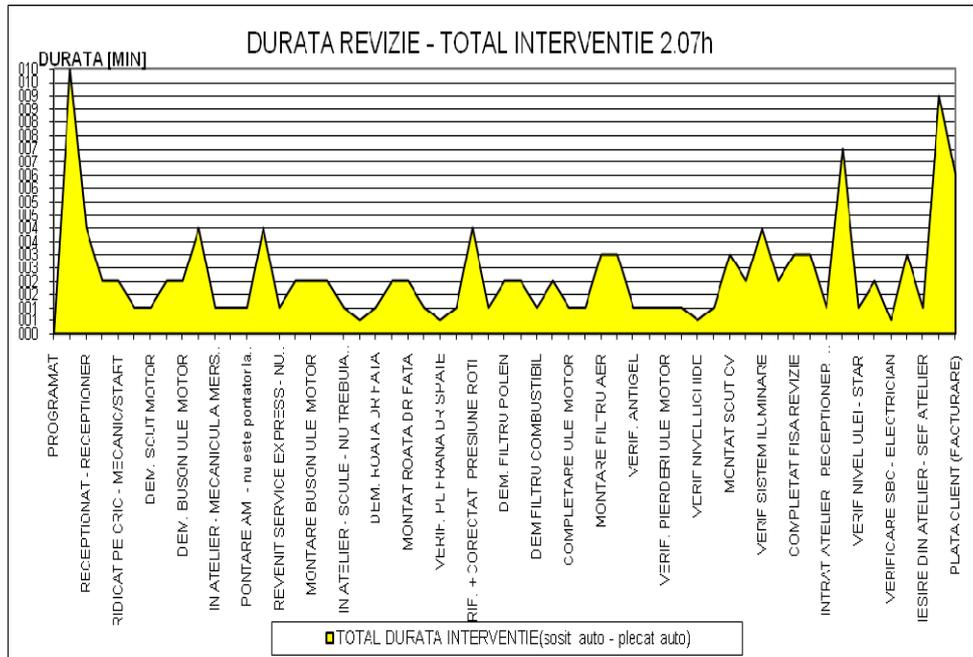


Fig. 2. Service intervention time. Capture

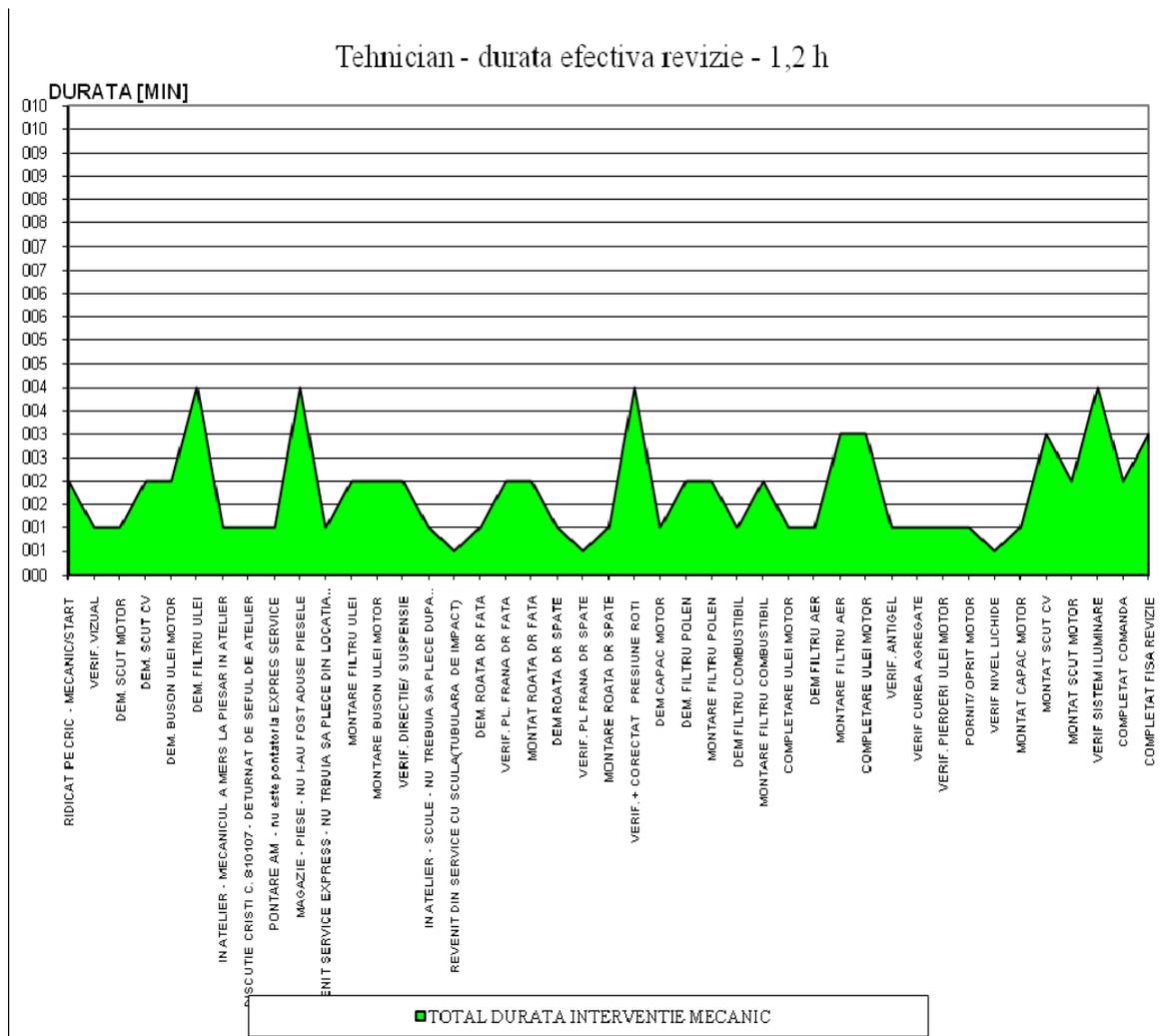


Fig. 3. The evolution of the effective work time. Capture

Poka Yoke is a Japanese concept introduced by Shigeo Shingo. The name of this concept is given by two Japanese words: Poka – unintentional error and Zokeru – to avoid. The method refers to the prevention of some accidental errors or at detecting errors before they occur. It consists of creating some devices or some product characteristics, which would eliminate any possibility of committing an unintentional error. As examples we can mention: protecting the rubber sleeve elevator structures that do not allow the direct contact between the motor vehicles doors and the elevator, the protection shutters applied on the motor vehicles fenders, on the buffers of the motor vehicles doors, hood, and trunk. It is essential for the organisation to have a long-term strategy based first and foremost on process management. When the employees see the result of the efficient monitoring of action within the unfolding processes, they become more aware and, last but not least more responsible. One of the measures required in order to monitor the documents drawn up as the process unfolds is the usage of checklists developed in a modern conception for checking service orders.

Correctly managing motor vehicle scheduling insures the implementation of the ‘pull’ type production concept within the motor vehicle repair process as well, efficiently charging the service workshops and at the same time insuring customer’s satisfaction, firstly by complying with the execution deadlines. Even so, in order to insure customers’ satisfaction we have to bear in mind the fact that, in the front office area, persons capable of creating and maintaining customer relations should be working.

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