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OBJECTIVES LIFECYCLE OF THE VEHICLE AS A FUNCTION OF THE QUALITY OF LIFE

Abstract: In each country used motor vehicles are a major problem for the environment. That was the main reason that developed countries put in place adequate legal act instituting the organized recycling of motor vehicles at the end of the life cycle. On the other hand develop models for managing waste generated by motor vehicles during the entire life cycle, which are based on the principles of sustainable development. In this way, minimize waste and maximize recycling of materials and reuse parts, assemblies and aggregates.

Keywords: recycling of cars, pieces of legislation, quality of life

1. INTRODUCTION

At the global development of life of modern man, in addition to new tehnologijan and various other improvements, healthy and unpolluted environment have become a rarity and a real treasure. Due to the turbulent technological progress of environmental pollution is the most conditional Mass production of certain products, and in the first place car production.

To make available potential of worn-out car was properly used in addition to good manufacturing practices, controls supply chains, processing and placement on the market, they must comply with the respective rules regulated by regulations prescribed by the authorities, and to the protection of the environment and thus the quality of life.

The automotive industry is a significant consumer of raw materials and energy resources, but also an important participant in the degradation of the environment. Therefore, the lifecycle management of vehicles an important aspect in today, and especially the future automotive industry.

Today in the world the number of vehicles grows exponentially, and is an increasing need to develop technologies to drive at the end of the life cycle. The technology of recycling of motor vehicles is one of the most important processes is the reuse of parts of vehicles at the end of the life cycle.

The logistics concept for the management of waste automotive develop organizations that are directly or indirectly involved in the

production and / or disposal of waste. The basic idea of the development of the logistics system for the use of automotive waste is to achieve a certain economic effect and automotive waste does not harm the environment. This means that the collection, processing, distribution, storage and handling of car scrap and its elements from generation to re-use should be in the function of environmental protection.

Considerable potential automotive waste should be properly used. The choice of technology for the utilization of automotive waste depends on many factors, the most important are the price of such use, the amount, type, quality and location of waste.

2. PROCESS CONTROL CAR SCARP

Troubleshooting automotive waste from the place of origin to the place of final disposal, includes the following activities: the process of collection, transportation, exploitation, processing and final disposal. Those aktivnosti make the waste stream. Waste streams depend on its properties, place of origin, or well as the obligations and responsibilities of those who are responsible for waste disposal. One typical method of treating automotive scrap is shown in Figure 1.

Waste management plan must have a waste producer who produces annually a certain quantity of hazardous and / or hazardous waste. The plan, which is adopted for a specified period of time and to the competent organization, containing information on:

- the type, quantity, place of origin and the trend of changes in the quantity of waste automobiskog,
- existing and predicted waste management and automotive
- own facilities and devices for the management of automotive waste.

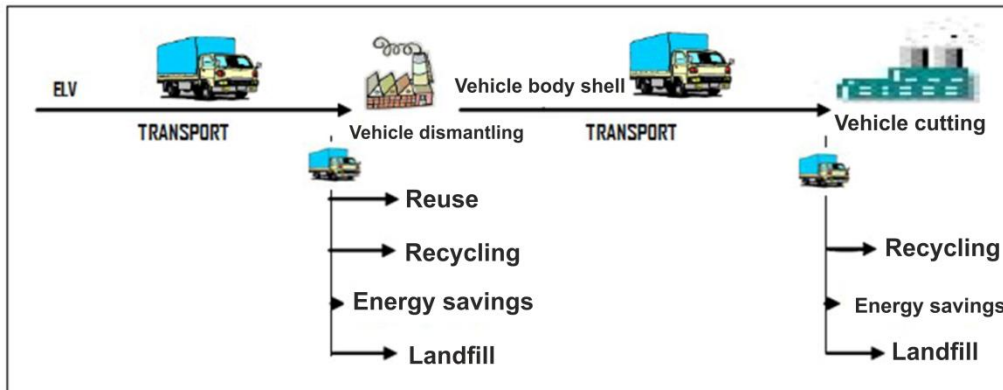


Figure 1. The treatment process of automotive scrap [4]

From the aspect of logistics as a tool, its tasks with the disposal of automotive waste are:

- that using logistic method works on solving problems in the field of transport has, storage, disposal and management of waste car.
- to monitor and analyze the applicability of logistics methods in the process of disposal of automotive waste and
- to provide feedback of the application of logistics methods for further development of logistics as a discipline and teachings.

The task of logistical support for the use of automotive waste are:

- 1) minimization of production costs,
- 2) minimize the cycle time of production,
- 3) minimization of inventory,
- 4) minimization of profit,
- 5) maximization of capacity utilization and
- 6) accurate determination of deadlines.

The logistics system for the disposal of automotive waste begins to operate waste collection, then placed the collected waste-disposal, and from there was transferred to defined places, depending on the purpose and the methodology adopted automotive waste management.

3. The use of (S-3) and

4. The recycling ELV (S-4).

Phase S-1 includes all research and development processes in different areas: market, product, technology, business strategy, and more. Outputs of this phase are: the market

2.1 Model car cycle

Based on the nature of the process, cycle of the car consists of four basic stages:

- 1) The research and development (S-1);
- 2) Production of (S-2);
- 3) The use of (S-3) and
- 4) The recycling ELV (S-4).

Phase S-1 includes all research and development processes in different areas: market, product, technology, business strategy, and more. Outputs of this phase are: the market position and commercial policy, technical documentation necessary for the production of cars, guidelines for the management of production and business processes, economic parameters (static and dynamic). Stage of development is the support of knowledge throughout the cycle. The production phase includes a wide range of manufacturing processes, from production parts and components, to the production of complete cars. Phase car use integrates all pre-sales and after-sales processes, namely: advertising activities, sales, service (maintenance of exploitation and after the warranty period), communication with customers and others.

After the expiration of the lifetime of the car, the phase of recycling of used vehicles, which includes all processes dealing with ELV, such as the download of the last owner, issuing certificates for deregistration, disassembly, preparation of materials for reuse through different types of technological treatment, delivery of parts for re-installation, delivery of materials for the manufacture of new products and energy and shipping to store useless waste. Material that can not be used by returning to the cycle, has to be permanently stored in accordance with regulations, at a suitable landfill.

The basic model of the car cycle, and make subjects participants who are connected to the circular flow of tangible and intangible. Model is a dynamic character and influences that are transmitted streams are interactive. Cash flows indicate that relations between entities based on market principles, except in the stage of recycling and storage of useless waste, where state institutions have the role of the regulator (the Financial Management), and which is the task of these entities. Information flows, enabling management of key performance indicators and management system, so as to ensure maximum utilization of materials, energy, or energy recovery. The implementation phase of ELV recycling is carried out to optimize the entire cycle.

In Serbia and Montenegro there is no specific legislation relating to the used cars, a system for recycling ELV has not been established. Already existing legislation is not respected nor takes control of its implementation. The recycling of ELV deals with a small number of organizations, primarily metals, a quantity of useless waste exceed 30% of the total weight of the treated vehicle. The role of collection centers took over the auto-wastes, which in most cases do not have adequate conditions for storage and dismantling. Repair used parts for reuse shall be inadequate technologies and using materials that do not provide the quality and reliability. On the other hand, the average age of the fleet exceeds 15 years, indicating a threat to traffic safety, as well as already present, especially the upcoming vulnerability of the environment

3. THE OBJECTIVES IN MANAGING THE LIFE CYCLE OF THE VEHICLE

Prevention is the main goal of the foundation of the pyramid - Figure 2, the car design (design solutions, choice of materials), as well as design of appropriate technological processes create the conditions for long service life of the vehicle, as well as to minimize the ongoing management during use and at the end of life of the vehicle.

The reduction is the next layer of the pyramid and the next goal and importance. It also provides the stage of development of the car and technology, but also in the process at the stage of production and use, through reducing the amount of materials, particularly hazardous.

Exploitation (RE) as a further object, means to return the ELV parts in the exploitation phase, in its existing condition or after the reparations, and manufacturing processes which will allow a part used for the same purpose.

Recycling (R) is the preparation of materials and their return to the production cycle. These materials are used to manufacture new parts for vehicles and / or for making other products.

Energy (E) is the last usable layer of the pyramid, which is related to the exploitation of the heat released by burning materials which can not be recovered for re-use in the form of parts and can not be used for a new production, while being suitable to generate heat.

Waste is the only part that can not be exploited, and as such does not belong in the objectives of the pyramid of life cycle management of the vehicle, but is a non-target and the undesired product to the end of the ELV chain, ie . useless waste.

Therefore, the amount of material that is not in one of these ways can not be used, must be less. Storage must be carried out in accordance with regulations.



Figure 2. Pyramid goals lifecycle management of vehicles [9]

3.1 Environmental aspects in the centers for the dismantling and recycling of vehicles at the end of the life cycle

Motor vehicle end of life is the source of a large number of different materials. This is logical, since it is composed of over 10,000 components with different roles on board, from energy production and launch vehicles to ensure safety and driving comfort. In addition to traditional materials (steel, aluminum, copper) of a motor vehicle there is a large number of toxic materials and substances, whether they are independently incorporated or integrated with other materials (for painting, the surface protection of metals, fibers in the composites). Having in mind such a complex product such as a motor vehicle is then the question of the necessary knowledge and responsibility for designing adequate and safe city for the dismantling of waste motor vehicles. The Center must meet a series of technological, logistical, safety and environmental requirements. All this requires mandatory certification center and obtaining a license to operate.

3.2 Structure of the Center

Center for the dismantling of waste motor vehicles consists of several related functional units:

- 1) admission and registration of motor vehicles at the end of the life cycle,
- 2) warehouse waste motor vehicles
- 3) The drive for the removal of-discharge of the working fluids (fuel, oil, cooling fluid),

- 4) 4 drive-disassembly disassembly of motor vehicles and the selection of components and materials,
- 5) storage for dismantled components and materials selected,
- 6) storage for drilling fluid and toxic materials and substances,
- 7) A storage and / or operation for shell / chassis and
- 8) vehicles (special vehicles for the transport of waste vehicles and vehicles for the transport of hazardous and toxic materials).

In addition to these functional units Center may have:

- facility for evaluation, cleaning and repair of components (parts, engine, transmission, etc.)
- warehouse of repaired components (spare parts for vehicles in service) and
- shop for remanufactured parts.

3.3 The impact of production processes and in the center on the environment

To reduce the impact of ELV recycling on the environment, which is one of the functions of the quality of life, it is necessary to perform certain technological predvidanja ELV recycling processes including production volume, extent of human resources, market and economic effects of doing business in a given period, as well as predictions of resources, needs or results of operation in the field of manufacturing and broader business systems.

Forecasting, planning and decision-making are performed within a common planning function in the system, except that the prediction is treated as a separate function within the system which differs from the planning although the organization are integrated in the unit [11] is the most advanced .Tehnološko prediction portion predicting paricijalnog in practice and is the input to planning, as it aims to examine the state of a phenomenon or event in the future in a way that will ensure that the planning process as accurately conduct [12] .Vreme, opportunities, needs, conditions and effects are the main contents of technological applications prediction [13].

When choosing a method of forecasting at ELV recycling process, it is important to pay

attention to the precision of the method, data availability, time horizon, cost and ease of application, because the selection falls on exploratory methods, among which is the Delphi method. Delphi method is based on intuition selected experts, in our case in the field of recycling of motor vehicles, which will in a rational and systematic way to fully utilize the aforementioned method, in order to quality supervised recycling process of detoxification, baling, recycling etc. All in function quality of life.

In order to identify opportunities to reduce negative impacts on the environment, it is necessary to analyze the unique products and processes. In order to identify and understand the environmental aspects of individual activities, products and services, it is necessary to collect their qualitative and / or quantitative characteristics relating to:

- inputs and outputs of materials and / or energy,
- processes and technologies used,
- plants and locations,
- methods of transport and
- human factor.

The most important information that should be collected to identify the environmental aspects related to:

- causal relationships between activities, products and services to real changes in the environment,
- interests of stakeholders in the environment,
- possible environmental aspects identified from other organs or regulatory required governmental permits and licenses.

Analyzing the impact of processes and products for the recycling of vehicles at the end of the life cycle on the environment were determined following environmental problems:

- transport of waste motor vehicles to the city (leakage of working fluid) and
- leakage of the working fluid in the storage of waste motor vehicles, atmospheric precipitation leaching oil and others. and pollution of soil and watercourses.

Discharge-straining work fluids- When removing the vehicle is first removed:

- motor oil,

- Transmission oil,
- brake fluid,
- coolant,
- washer fluid glass
- residual liquid fuel (petrol, diesel).

These liquids are discharged into the appropriate storage medium, with clear signs of working fluid. Liquids are finally stored in appropriate barrels or tanks, which are provided on marked and secured site / warehouse.

Disassembly of the motor-vehicles After removal of the working fluid follows the separation of the motor vehicle up to a certain degree dekompletiranja depending on the type of the vehicle and a state in which it is located. In doing so, special attention is paid to strip components that contain hazardous materials / substances. These are primarily:

- the dismantling of the airbag system,
- removal of tanks and filters,
- removal tanks for gas,
- removal of the air conditioning device,
- removal of the battery,
- removal of components which contain toxic substances,
- removal of oily components and parts,
- stripping of plastic parts that contain toxic organic matter (bumpers, seats, etc.) And
- removal of tires and other components.

For disassembly of the vehicle to let the remaining working fluid, grease or paint falling onto the floor. This requires proper maintenance of the floor washing

4. LAWS AND STANDARDS FOR RECYCLING CAR

The standards and regulations must be applied directly in the center of dismantling scrap vehicles are as follows:

- EU Directive 2000/53 EC-motor vehicle at the end of the life cycle,
- The EU Directive 2002/96 EC-electrical and electronic waste,
- EU Directive 2002/95 EC-dangerous substances,
- Law on Waste Management,
- ISO 9000 standard,
- ISO 14000 standard,

- OHSAS 18000 standard,
- ISO 22628- recyclability of motor vehicles, and others.

4.1 Certification from the aspect of environmental protection

Getting a license is based on the National Strategy for Environmental Protection, Waste Management Law and consideration of needs for capacity for the dismantling of motor vehicles at the end of the life cycle. In 2009, Serbia has established a network of centers for the dismantling and recycling of vehicles at the end of the life cycle. However, the build system did not follow the set standards and direktiva but licenses to companies in this initial network date declaratively, without any prior research and verification sheet.

Responsible autoritet- Ministry of Environment and Spatial Planning or authorized accreditation body should do the program accreditation collectors and demountables motor vehicles at the end of the life cycle and it is fully implemented. At the moment the system is composed of 10 demountables, a shredder and about 80 reciklažera for different types of material, distributed randomly throughout the territory of the country.

How are waste motor vehicles designated as hazardous waste, demountables must meet relatively tough requirements (technical, environmental, personnel) for the building, the location and performance of activities. The Center must have adequate space and equipment for the technological processes, adequate facilities for the storage of waste vehicles, the extracted working fluid, usable parts of dismantled materials and components, hazardous material and compressed / pressed shells, waste and the like.

End of life vehicles in Serbia should:

- The Association monitors the recycling of motor vehicles Serbia;
- representative of the Association should be obliged to be a member of the expert team of the Ministry for the Environment in the preparation of the Regulations and related documents;
- give a clear demand for activities - recycling stages that businesses should meet in order to participate in their implementation;
- A working version of Regulations required submit for consideration by the Chamber of Commerce of Serbia and the Association;
- to do an accurate analysis of the cost of the recycling process in order to compensate for its objective the sustainable realization on the territory of Serbia;
- Suitable Ministry immediately solve the problem of downloading and management of the fluid (hazardous) and other toxic materials which have been made and produced in the process for dismantling vehicles (antifreeze, oil, brake fluid and the like);
- enterprises in this activity in cooperation with the Association set an example to the public, the integration of legal provisions in commercial activities in order to protect the environment;
- The Ministry of Finance of the Republic of Serbia decreases (appropriate examples of good practice from the region) customs duties and taxes in this activity to the purchase of secondary materials and the import of equipment;
- Government preferred credit policy support this very low accumulative significant activity (particularly in terms of the World crises);
- Ordinance on the recycling of motor vehicles solve review, inspection and certification of used parts as well as significant economic components in the recycling of motor vehicles;
- All the technological processes in the recycling process equally to deal with;
- Ministry in defining professional and educational requirements to the companies that are in this activity, take into account the existing qualification structure of present human resources;
- after this extremely useful and successful Conference soon initiate new meetings with clear operational objectives to increase economic

efficiency and effectiveness in this area.

4.2 Requirements for ELV legislation

The regulations relating to storage of waste, in conjunction with ELV legislation are:

- The revised Law on waste containing all waste streams;
- Regulation of waste dumps (landfills untreated gradual reduction of high-calorie waste);
- Regulation of hazardous waste;
- Regulation on shipment and incineration of waste;
- The regulations relating to specific waste streams: oils, car batteries, tires, packages, electric and electronic waste and ELV.

5. CONCLUSION

In each country used motor vehicles are a major problem for the environment, both in terms of volume of waste and its numerous

hazardous materials from which they are built. That was the main reason that developed countries put in place adequate legal act instituting the organized recycling of motor vehicles at the end of the life cycle. On the other hand develop models for managing waste generated by motor vehicles during the entire life cycle, which are based on the principles of sustainable development. In this way, minimize waste and maximize recycling of materials and reuse parts, assemblies and aggregates.

With the development of science and technology, man has created the need for their large number of complex chemical composition of materials. Such materials are difficult due to its complexity or even not at all can break down naturally or by the time of their degradation can be considered infinite. Deposition of such materials, no matter whether on a regulated or illegal dumps pose a potential risk of environmental pollution. The recycling of these materials, in addition to economic profit a man protecting the environment, which results in higher quality and healthier life of the man himself.

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