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MOBILE PRESS FOR CAR RECYCLING DEVELOPMENT

Abstract: Elements of development of mobile press for recycling shells of cars are given in this paper. Considered reasons for the implementation of mobile press and presented originally developed constructional documentation. Development plan is very important because it must be based on quality processes which will like a goal have desired performances of product.

Keywords: car recycling, mobile press, requirements analysis

1. INTRODUCTION

The automotive industry is the initiator of economic development that integrates advances in the field of engineering, technology and almost all other disciplines. The experience and knowledge gained in the research related to the processes of development, production and operation of cars are increasingly being applied in other industries. On the other hand, the automotive industry is a significant consumer of raw materials and energy resources, as well as an important participant in the degradation of the environment. Therefore, the lifecycle vehicle is an important aspect today, and particular in the future of automotive industry.

Each vehicle can experience the end of its life in two ways:

- when the vehicle is totally damaged, which may be the result of an accident, flood, fire,
- the naturally the end of its life.

For successfully use all automotive waste it is necessary to analyze all the requirements that are important in the recycling of motor vehicles. Recycling of

old cars before the commencement of any process to develop the system of waste collection vehicles. It should provide adequate storage space in order to deliver the appropriate treatment of used vehicles and their components.

Significant potential of automotive waste, which is available in the Republic of Serbia, should be properly used. The choice of technology for the use of automotive waste depends on many factors, the most important being the use of price, quantity, type, quality and location of the waste. For rational management of car waste it is necessary to develop and participate in the process of mobile presses auto waste. The basic idea in the development of mobile presses using automotive waste, it is, to achieve a particular economic effect, and automotive waste no harm to the environment. This implies that the collection, processing, distribution, storage and handling of car waste and its elements from the beginning to re-use should be carried out in function of the minimum price, as well as regulations and guidelines concerning the protection of the environment.

2. ANALYSIS OF REQUIREMENTS AND METHODS FOR MOBILE PRESS DEVELOPMENT

For car recycling of the famous steel manufacturer such as Mercedes, Opel, Audi, Toyota, Kia and others, it is necessary to define the dimensions of the mobile press molding shells that allow the above car. Press defined dimensions can be used for special vehicles (eg SUVs) listed manufacturers.

The globalization of markets raciklaže car caused the high specialization of manufacturers of components, such as compressors, electrical components, etc.. Therefore, the development of mobile baling presses of automobile design methods based on standard solutions, which are in the later process of adapting to each individual customer.

From the perspective of the dominant design technology to be applied technology CAD (Computer Aided Desing) system, which can be associated with design installation and get a CAE (Computer Aided engineering) system.

Special emphasis in the design of equipment for recycling should be placed on high functionality, high energy efficiency, mobility and low cost of the equipment.

3. INPUT REQUIREMENTS FOR MOBILE PRESSES FOR PRESSING OF AUTOMOBILE

Based on the defined concept for the development of mobile presses for molding automobile body, it is possible to determine the basic marketing processes, and they are:

- 1) determination of the relevant market,
- 2) identifying the needs and desires of consumers, ie. customers and their satisfaction,

- 3) connectivity or integration of other business areas,
- 4) promotion of products and services,
- 5) processing demands of customers and contracting
- 6) delivery of products and services,
- 7) services
- 8) processing of complaints and
- 9) the records.

All business processes for the development of mobile presses can be reduced to the following processes for the successful operation of marketing:

- 1) defining the target market,
- 2) satisfaction of wants and needs of customers,
- 3) connect to other business areas and
- 4) delivery of goods or services.

In the process of identifying markets for mobile presses, it is necessary to identify the following:

- 1) that consumers - customers,
- 2) required quality of the product,
- 3) buying motives,
- 4) ways to buy, place and etc.

In identifying the needs and desires of customers and evaluate their satisfaction with mobile presses for molding automobile body it is necessary to do the following:

- 1) determine the requirements for the research,
- 2) set the agenda and program of research,
- 3) shape the results and perform their analysis,
- 4) present research results and
- 5) dispose relevant results to users at different organizational levels.

The basic aim of activity for mobile presses should be reduced to:

- 1) identification of needs and demands of consumers,
- 2) classification and distribution of consumer demands,
- 3) review Committees,
- 4) bid preparation,
- 5) negotiation and compliance requirements,

- 6) contract for the sale of products and services and
- 7) assessment of consumer satisfaction with products purchased (through surveys, observations, anonymous purchasing, etc.).

In the process of integration of other business areas of the business processes of marketing for mobile presses should be reduced to the following:

- 1) information on market trends,
- 2) information about the difficulties of selling,
- 3) Information about market innovations in products and technology,
- 4) Information about the intentions of competitors,

- 5) giving ideas, suggestions, views and opinions regarding changes modes and action
- 6) continuous cooperation in all stages of preparation and implementation of changes in the product range of individual products.

In the process of delivery of mobile presses for molding automobile body business processes of marketing should be cited as:

- 1) preparation of delivery,
- 2) execution of the delivery, and
- 3) control delivery.

In Table 1. given input requirements mobile press as a new product.

Table 1. Requirements

No.	Requirement	Value
1	max length	10850 mm
2	max width	2800 mm
3	max height	2100 mm
4	max pressing force	2500 bara
5.	max weight of the car baling	1500 kg

3. 1 Constructive documentation of mobile press

project TR 35033 developed a constructive documentation for the mobile press. A conceptual design of press is shown in Figure 1.

The project team working on the

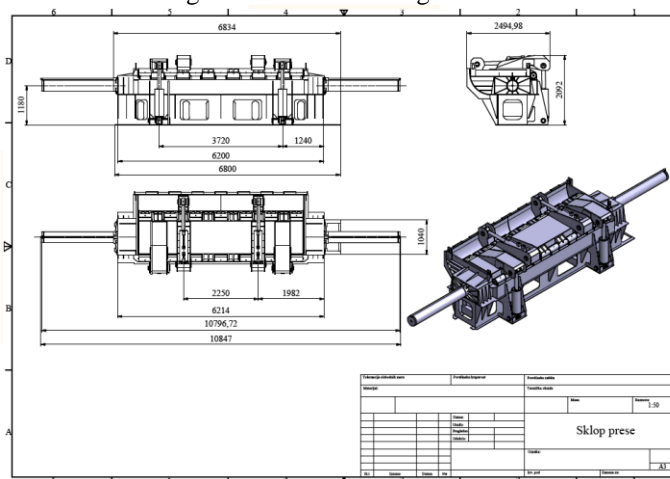


Figure 1. Conceptual design for the mobile press

NOTE :

For crimping automobile body is the most important component of the axial piston pump type B2PPV50 * (LINDE), which is the regulation of the force but, in terms of cleanliness of hydraulic oil much more demanding. Due to its performance this level of work pressure is favorable. Because the most important cycles of compression (the solution with axial piston pump from the group 3112,750. *) Pressing time $t = 200s$, speed $v = 0.7 \text{ m /}$

min., (For the full journey working cylinder 2300mm).

- Power required to drive the hydraulic part is about $P = 45 \text{ kW}$.
- The suppression of the pallet is made using cranes used to perform batching and, after pressing, "download" otpresovanih steel ball.

Recap cost to complete delivery is shown in Table 2.

Table 2. Recap cost

No.	System (component)	Pcs (set)	Supplier offer	Note
1.	Diesel motor (90 iči 110 KS)	1	Use existing (transport)	Upgrades to the system to install and activate the pump
2.	System to turn on the pump (adapter and pneumatics)	1		350€
3.	Hydraulic system presses Variant IR(RPIH-8429) Variant II(RPIH-8429/1)	Set	PPT-Hdraulics 04-130328/13 04-130329/13	1.046304,00 1.495896,00
4.	Hydraulic cylinders -set-	(2+2+2)	PPT- cylinders	
5.	pneumatic system (preparation of the air and the possibility of lubricating grease 16)	Set	PPT- Brake PPT- industrial	1500€ 2500€
6.	The control system of press 13021301	1	INDEL-KONTROL V.Banja	2586€
7.	Making (scheme, description, instructions) and documentation of Built condition		Along with equipment suppliers	2000€
8.	Installation of pneumatic and hydraulic system in Trstenik			3000€
9.	Project control			1000€

4. CONCLUSION

Applying the model of integrated and sustainable recycling of motor vehicles at the end of the life cycle can be expected multiple positive effects. These are primarily technical and economic effects, environmental effects and the effect of the development of new industries (recycling of motor vehicles).

Development and production of mobile presses for molding automobile body can be achieved techno-economic and environmental effects.

Techno-economic effects are reflected through:

- 1) economic viability of motor vehicles at the end of the life cycle,
- 2) increasing levels of energy efficiency,
- 3) development of the recycling industry of motor vehicles at the end of the life cycle,
- 4) re-installation of recycled materials in new vehicles
- 5) the use of remanufactured parts, components and devices,
- 6) sustainable use of natural resources (minerals, energy)
- 7) foreign direct investment,
- 8) healthier environment,
- 9) ensuring quality development of the domestic auto industry and exports,
- 10) development of socially sustainable car (new recyclable materials, waste minimization, minimal impact of motor vehicles on the environment) and
- 11) development and application of new "green" technology, etc.

Ecological effects are manifested through the reduction of direct and indirect impacts of motor vehicles at the end of the life cycle of the environment in Serbia.

If we bear in mind the very incident situation of used motor vehicles on the environment, such as a large number of illegal dumps, waste fluid on the ground and in the rivers, heavy metals, plastics, rubber and so on., Then the application of the proposed model is expected next environmental effects:

- elimination of landfills, leaving and throwing vehicles at any place,
- proper handling of fluids and their full recycling,
- Full recycling of metal materials (iron / steel, non-ferrous metals)
- maximum possible recycling of other materials (plastics, rubber, glass, etc..)
- permanent disposal of waste to designated landfills
- improving the quality of the environment in Serbia removal of motor vehicles at the end of the life cycle of the natural environment,
- sustainable use of natural resources for reuse of already used materials, indirect impact on the improvement of environmental quality for recycling material at a higher level of processing (as opposed to receiving the same from natural sources, reduced consumption of energy, water and the like.

Using models of integrated sustainable recycling of motor vehicles at the end of the life cycle effects of employment in Serbia are realized through the development of new industries and businesses to recycle vehicles at the end of life and the creation of new jobs in the recycling of motor vehicles.

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