

## RECYCLING OF CARS IN POLAND - CURRENT PROBLEMS

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### **Abstract**

*Poland is now in the course of creating the nation-wide recycling system for withdrawn from use vehicles. The paper presents problems concerned with these issues. In the field of the recycling in Poland there are now in operation several information systems. In order to fulfil the requirements of the UE Directive, there is a need of introduction of the new system having more general character and giving possibilities for evaluation the levels of recycling. Such a kind of the system is worked out in the Institute of Machine Design Fundamentals of Warsaw University of Technology. Using this system which is operated via the INTERNET, one can create and collect reports about the recycling. It may make the information flow in the national recycling system more efficient. The paper characterizes the system of disassembly stations and recycling plants, the changes in the building of cars and information systems for evaluation the levels of recycling. The disassembly stations for cars in Poland, financial flow in the recycling system, tendency for the changes of construction materials used in the car manufacture, information flow in the national recycling system are presented.*

**Keywords:** *transport, vehicles, environment protection, recycling, information system*

### **1. Introduction**

Poland is now in the course of creating the nation-wide recycling system for withdrawn from use vehicles. On 20 January 2005 there was passed the Legal act on the withdrawn from use vehicles (the Journal of Law No. 25, position 202), that is in force since 14.03.2005. In order to develop next the system it is important to bring about the mechanisms of implementation, which are created by the act, especially as: the system of disassembly stations and points of collecting the vehicles, the collecting system created by economic subjects introducing cars on the market, the system for finance and for information flow (which is monitoring the levels of the compliance with requirements of Directive 2000/53/WE of the European Parliament and the Council from 18 September 2000 on the withdrawn from use vehicles). In 2005 there were worked out and began their validity implementing regulations of the act of Ministers: the Ministry of Infrastructure (now: Ministry of Transport and Construction), Ministry of Environment, Economy and Labour (now: Economy). This system will be adapted in an ever-changing construction of cars, especially to a proportion of materials applied in the car building.

### **2. The System of Disassembly Stations and Recycling Plants**

The last year in our country there was changed the legal basis for acting of the disassembly centres for cars withdrawn from operation. So in effect, over 750 plants having certificates published in the Law on road traffic have converted to the lesser number of disassembly stations that have the certificates issued on the basis the Legal act about the recycling of the withdrawn from operation vehicles. The topical map (20.02.2006) describing the system of these stations in each voievodstvo is shown in Fig.1. At this moment 373 disassembly stations obtain special certificates (just as approximately 60 points of collecting vehicles). It means that doubts expressed

in the mass media are not to be confirmed- since 30 June this year the process of the recycling of vehicles will not be disorganized due to lack of disassembly stations having the certificates and permission for such an activity. We know from experience that in the market economy in Poland and in the other EU members countries, (especially in Germany) the best economic results obtain the midsized centres utilizing several thousand of the withdrawn from use vehicles yearly.

These plants not only make disassembling works but connect their main activity with:

- D-Lower Silesian
- C-Kuyavian – Pomeranian
- L-Lublin
- F-Lubusz
- E-Lodz
- K-Lesser Poland
- W-Masovian
- O-Opole
- R-Subcarpatian
- B-Podlasie
- G-Pomeranian
- S-Silesian
- T-Świętokrzyskie
- N-Warmian – Masurian
- P-Greater Poland
- Z-Western Pomeranian



*Fig. 1. The disassembly stations for cars in Poland considering all voivodships*

- purchasing centres of scrap, rechargeable batteries, oil etc.
- the sale of spare parts
- mending a vehicles in car repair shops
- towing of vehicles
- making routine inspection of cars and vehicles.

According to the evaluation of these problems in [4] and [5], it is likely to happen, that ca. 250 stations of disassembly will be soon operate. It can be possible to recycle about 750 thousands of vehicles yearly, and, as it say prognoses that be up to needs of our country during a dozen or so years. It is quite probable that each of these recycling centres will disassemble 3 thousands of vehicles annually and it is possible without obtaining so-called ‘integrated permission’. The stations should have better equipment, especially:

- stationary immovable system for oil removal from disassembled vehicles, the estimated costs are about 80 000 – 100 000 zł in each disassembly station,
- equipment for disassembly glass windows in vehicles, the estimated costs are about 10 000 zł in each disassembly station,
- an infrared analyzer for spectrum analysis of chemical constitution in polymers for a wider selection of plastics parts, the cost is about 40 000 zł in each disassembly station,
- flattening machine, ca. 200 000 zł,
- a line for rendering harmless and manufacture new products from foamed polyurethane utilized in car seats, the cost about 63 000 – 110 000 zł.

Up to the end of 2005 manufacturers introducing on the market more than 1.000 vehicles a year are obliged to organize the system of collecting the withdrawn from operation vehicles. There is a need for delivering the worn out cars from the distance no longer than 50 kilometers in the straight line, and thus, it requires uniformly spaced 70 centers in our country. In consideration of the necessary space non-uniformity, it must be 100 stations. Moreover, these centres may be disassembly stations. Running the stations only for collecting the cars, is rather irrational economically because they generate entirely costs, but no incomes. They cannot give incomes since in such conditions it is impossible to disassemble the vehicles.

The cost of building of a quite new disassembly station is approximately 2 millions zł, as it was evaluated in [4] and [5]. The creation of a quite new system is a difficult and expensive task. The requirements for the creation of the system will be fulfilled when the producers enter into contract with the owners of disassembly station. This kind of contracts may have been signed since 30.06.2005. At present there is no fully comprehensive information available on the existing systems.

An appraisal may be given at the beginning of 2007 when the economic subjects, that introduce cars on the market, will file reports. But there is a problem with the recycling in Poland, it is a big illegal "grey zone" where disassembly of cars and vehicles beyond the licensed enterprises is possible. According to the evaluation [2] the "grey zone" takes over 80 % of withdrawn from use cars. The elimination of the "grey zone" is a difficult task, the act on recycling of withdrawn from use cars has the article 49, under it, this kind of transgression is penalized. This law has been already in force but the problem is how enforce the laws of the land. In the light of the law on the recycling of withdrawn from use vehicles the Inspection for Environmental Protection is authorized to play the role of supervision for this system. It may increase the efficiency of the supervision when it will be leading by the professional, expert and specialized office.

It seems to us that more efficient may be using of the financial encouragement to deliver the withdrawn from use vehicles into recycling system. Similar procedures are now implemented by the stations of disassembly of the system ARES [1].

### **3. The Changes in the Building of Cars**

As we see (Table 1.), the recycling of plastics will be a challenge for the next several years. A new research evolving methods for the economically profitable processing and utilization of plastics must be conducted and new investments in the processing plants ought to be done. This plan needs a great amount of skill and effort to be achieved. This kind of activity is now performing- the best known in the world automotive companies having in this field a lot of achievements.

Nowadays, there is a visible trend of changes for proportion (Table 1) of materials used in the manufacture of cars- the portion of parts made of steel (iron) is now decreasing (steel is one of the important income sources in the system of disassembly stations) and opposite, the portion of the plastic parts is increasing (plastics are usually troublesome and generate additional costs).

Accordingly to the growing up needs, disassembly must be done on greater range and scale. Assuming that disassembly is done by the worker employed on the basis of a contract of employment, which has the right of full-pay leave and medical sick leave (approximately 10 days yearly), we can evaluate the amount of an hour of work: by the assumption of the minimal salary (849 zł in 2005) as 7.43 zł, and by the assumption of average salary in the sector of enterprises (2385.98 zł – October 2004), as 20.87 zł. Assuming that "deep" disassembly will consume 5 hours of works more, we obtain increasing of costs in an amount ca. 100 zł per one vehicle which is withdrawn from operation. Now, disassembly of one car lasts about an hour.

In order to cover the increasing costs of disassembly, the financial system, created by payments done by the economic subjects introducing cars on the market and having not got their own

systems of collecting (500 zł per a car), must be highly reliable. The schema of the financial system accordingly to the Low on the recycling of withdrawn from use vehicles is shown in Fig.2.

One should expect that majority of payments will be done by private persons who individually import used cars to Poland. For the last several years, the individual import of cars has rapidly grown. Such a situation was especially after the Poland's accession to the European Union (01.05.2004). In 2004 were imported over 800 thousands of used cars to Poland, in 2005 a little bit more - ca. 870 thousands.

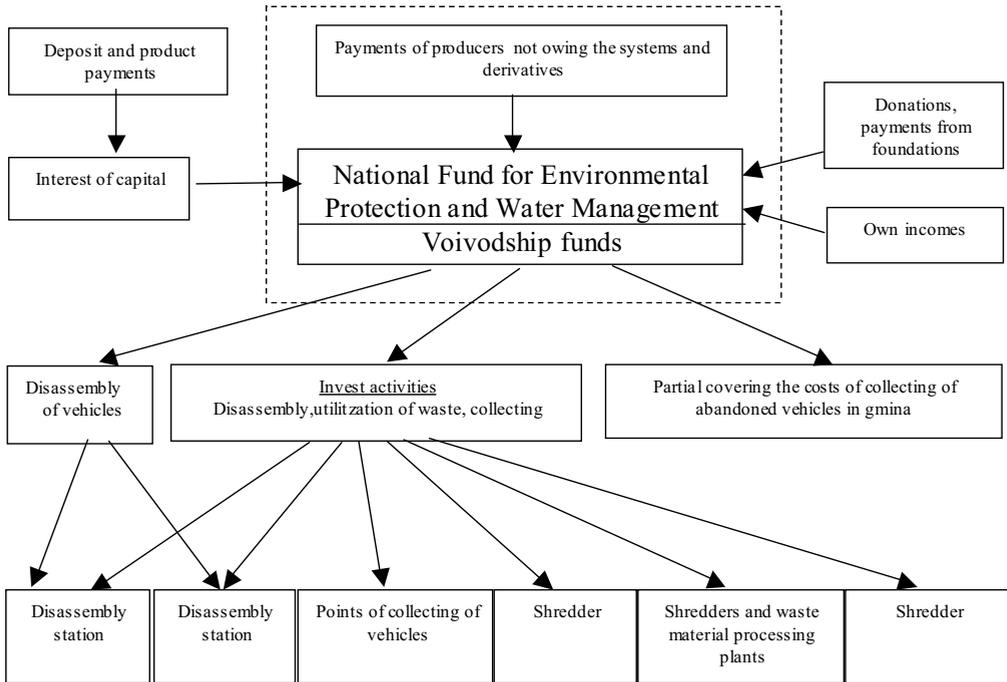


Fig. 2. Financial flow in the recycling system

In January 2006, after the introduction of new fees (500 zł), the import of car diminished up to 39622 vehicles in opposite to 55738 cars in January 2005. That is the 30 % decrease but it is still significant number. On the basis of the data concerned with only one month, it is rather impossible for us to find a conclusion whether a downward trend in import of used cars is permanent or temporary.

Table 1. A tendency for the changes of construction materials used in the car manufacture

Production	1980 – 1990	1990 – 2004	2005 – 2015
Steel, iron	72 %	62 %	40 %
Non-ferrous metals	4,5 %	5 %	5.5 %
Plastics	7,5 %	17 %	38 %
Rubber	5,5 %	6 %	6.5 %
Glass	3,5 %	3 %	2.5 %
Fluids	5 %	5.5 %	6 %
The rest	2 %	1.5 %	1.5 %

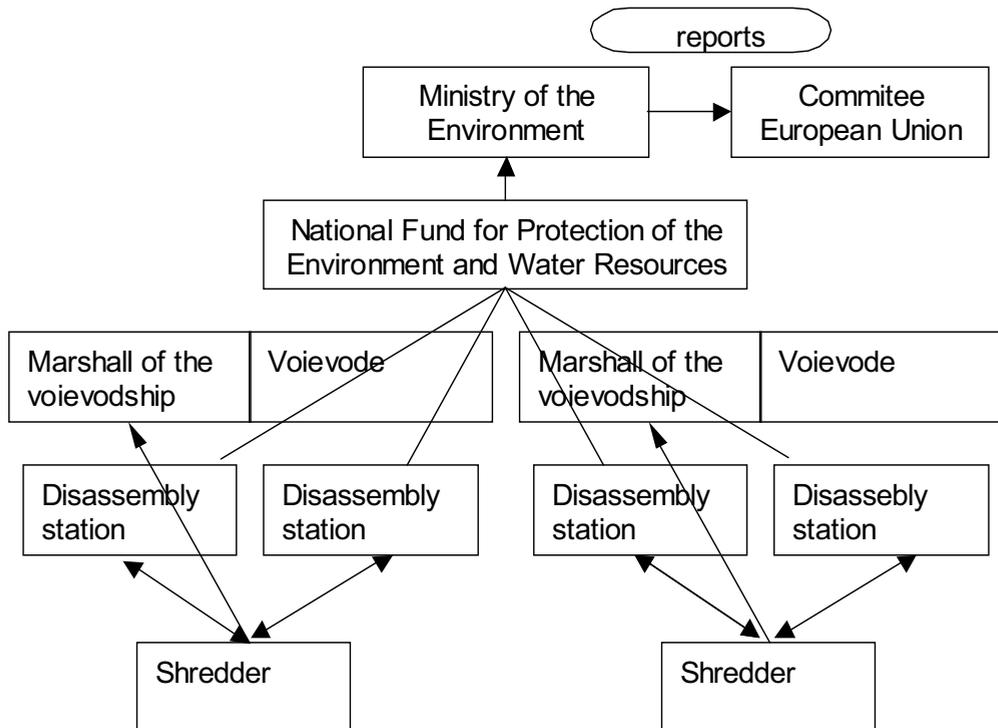


Fig.3. Information flow in the national recycling system

#### 4. Information Systems for Evaluation the Levels of Recycling in Poland

In the recycling sphere in Poland there are now in operation several information systems. These systems in particular are similar to the ‘virtual stock market’ that enlarge effectiveness of sale of spare parts. As a good example can be ARES system with the central office in the firm AMBIT at Dobrzyniewo Duże near Białystok. In order to fulfil the requirements of the UE Directive, there is a need of introduction of the new system having more general character and giving possibilities for evaluation the levels of recycling. Such a kind of the system is worked out in the Institute of Machine Design Fundamentals of Warsaw University of Technology. Using this system which is operated via the INTERNET, one can create and collect reports about the recycling level (renewed utilization) [3]. It may make the information flow in the national recycling system more efficient. Requirements the law on recycling in this field are presented in Fig 3.

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