PRODUCTS RECOVERY OPPORTUNITIES AT THE END OF TECHNOLOGICAL CYCLE

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Rezumat. *Pentru a evita retragerea costisitoare a utilajelor, ajunse la sfârşitul ciclului de exploatare, proiectanții trebuie să stabilească procedurile de recuperare, refabricare şi reciclare, înainte de specificarea atributelor structurale ale acestora. Considerarea adecvată chiar din faza de proiectare, a reciclabilității utilajelor, întăreşte ecologia industrială prin utilizarea rațională a resurselor naturale şi a energiei precum şi reducerea deşeurilor. Refabricarea echipamentelor tehnologice poate fi îmbunătățită semnificativ, prin concepția şi proiectarea acestora în direcția refabricării, având în vedere principiile dezvoltării durabile.*

Abstract. *In order to avoid costly retrieving of equipment on their end of life, the designers should state the recovery, remanufacturing and recycling procedures, before specifying their structural characteristics. Taking into account effectively the recycling capacity of equipment even since the design stage, enhances both the industrial ecology by rational use of natural resources and energy and the waste reducing. The remanufacturing of the technological equipment may be significantly increased by their projecting and design towards remanufacturing, looking for the principles of durable development.*

Keywords: Remanufacturing, Recycling, Technological Cycle, Manufacturing Cycle, Economical Cycle.

1. Introduction

Intelligent original equipment manufacturers can use the remanufacturing to collect valuable information for projects, functions and after-sales activities improving. These advantages are lost if their products remanufacturing business is taken by third parties.

2. Remanufacturing

The remanufacturing practitioners give remanufactured products at least the same warranty as similar new products, showing that their products have the same quality as those new.

The technological equipment is considered remanufactured when, for its realization are necessary the following stages:

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- The basic components came from a used product;
- The used equipment is disassembled into component parts;
- The component parts are cleaned so that no corrosion traces remaining;
- All defects have been corrected;
- The remanufactured equipment is start-up in the working parameters by execution technical documentation;
- The technological equipment usability and performance are identical with those of similar new equipment.

Economically the remanufacturing activity usually occurs after the decline phase and with the physical wear stage of technology equipments, but in certain situations can faster occur.

Technological equipment can be remanufactured before reaching the physical wear stage, only if its owner decides to use the divestment application process (fig.1).

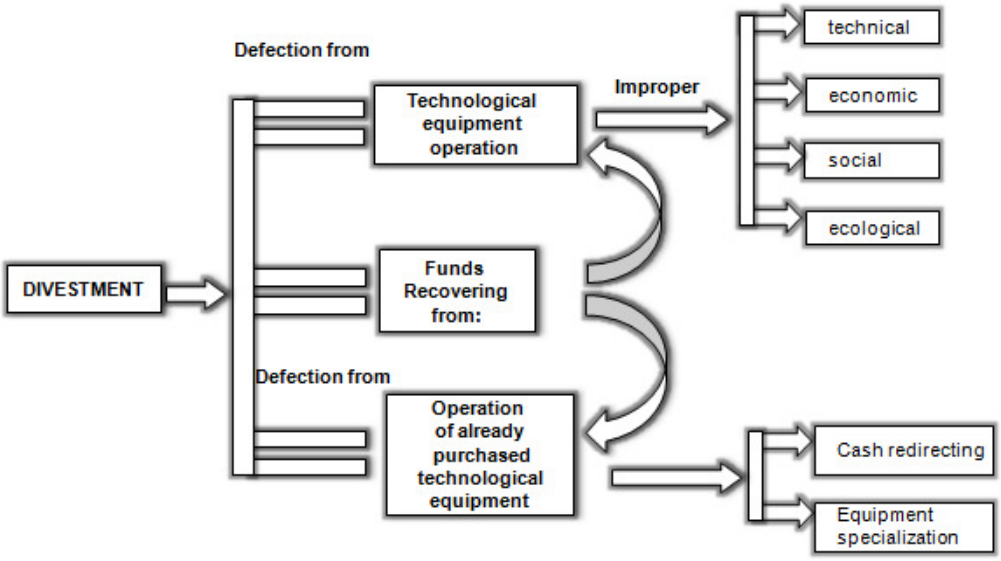

Fig. 14. Divestment definition

Divestments economical opportunity is the moment that the "today savable value" it is superior to all future discounted cash flow lost, corresponding to all possible remaining lifetime. Remanufacturing of divestments equipments is influenced by factors such as:

- External factors;
- Endogenous factors.

Significant accessions in technological equipment eco-efficiency can't be achieved through incremental improvements of existing technologies. Rapid leaps

in technological development are essential for materials reuse, recycling and remanufacturing promoting. The new materials research but also assemblies and subassemblies simplifying, modularity and typing are several elements that are giving remanufacturing a new motivation.

Due to economical, social and ecological remanufacturing advantages more specialized original equipment manufacturers are engaged in products remanufacturing activities. Occur, so-called hybrid companies, manufacturer and remanufacturer of the same equipment type, which propelled the remanufacturing industry in the national economies.

There are a number of legal impediments that hinder the remanufacturing activity, which can be seen in Figure 2.

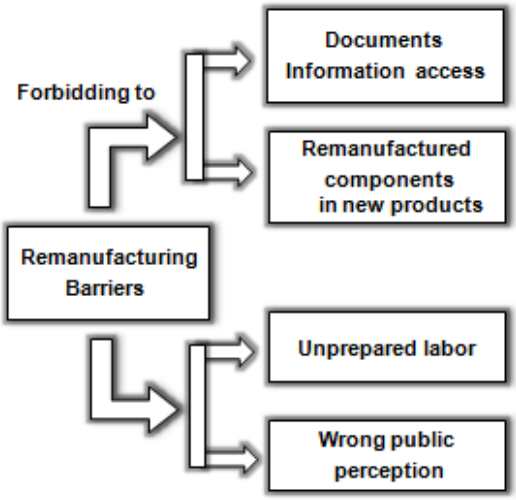

Fig. 15. Remanufacturing barriers

3. Life Cycle

Product life cycle similar to the biological life cycle includes the next stages: the arising phase, growth phase, mature phase and decline phase. Product life cycle can be divided in:

- Manufacturing cycle;
- Operating cycle.

Manufacturing and operating cycle of equipment consists of all manufacturer and user activities. Operating cycle is very important because depending on technological equipment operation, their component parts may or may not show remanufacturing interest.

The most important feature of the operating cycle is its duration. Length overall of equipment operating cycle varies from one product to another. It depends on the analyzed product type and also on several factors; such as (see figure 3):

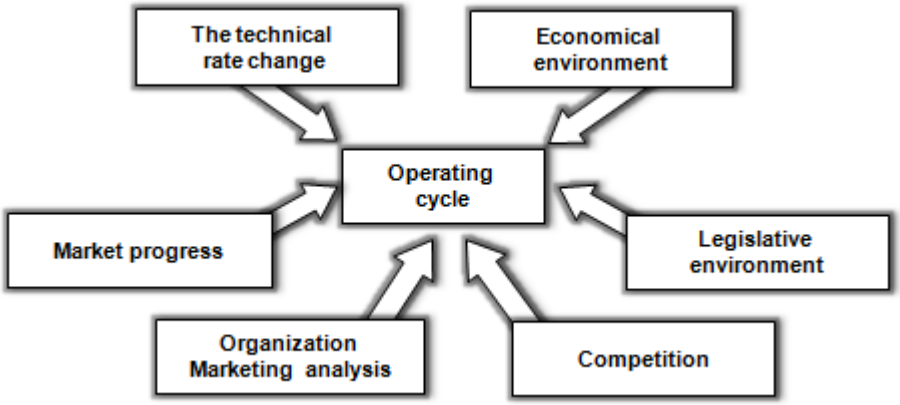

Fig. 16. The influence factors of the operating cycle

Manufacturing cycle involves several stages, as can be seen in Figure 4.

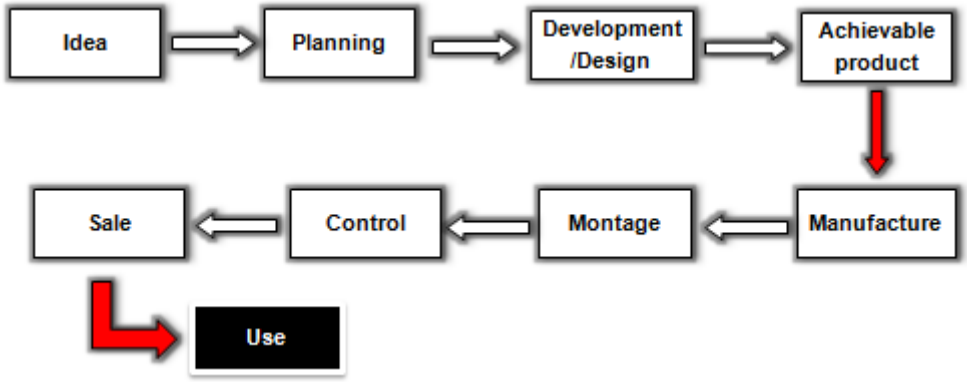

Fig. 17. Manufacturing cycle operation

Part of the operation life of technological equipment, generally is physical and/or moral wear dependent and also on a number of economic issues. Product recovery is the operating cycle next stage.

After an operating cycle, or even before its completion, technological equipment includes the following processes, as the Figure 5 shows.

In addition to manufacturing cycle and operating cycle can be specified also the products economical cycle.

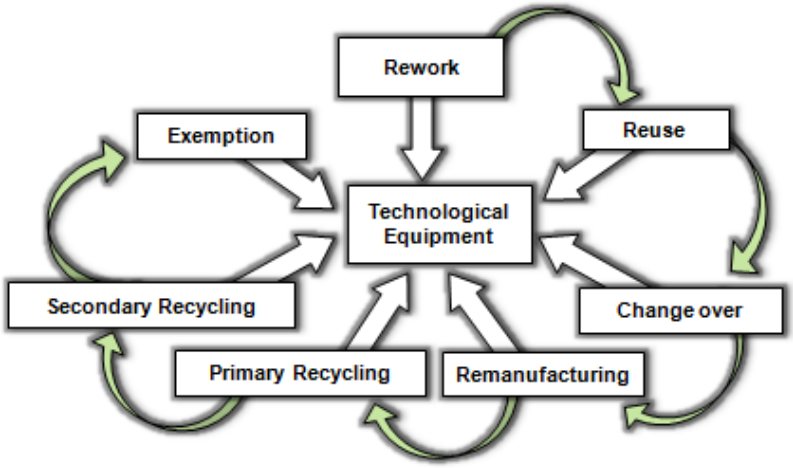

Fig. 18. The technological equipment processes

The economical cycle is an aggregating concept of all steps associated with the development, production and disposal including: introduction, growth, maturity and product decay, stages analyzed in terms of financial effort and profits.

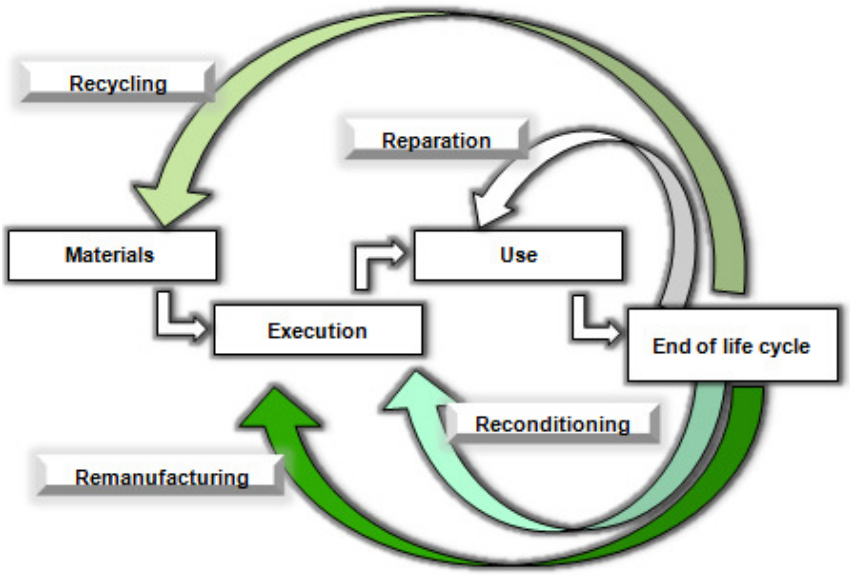

Fig. 19. Extended product life cycle

The product economical cycle can be considered, not just materialize on successive stages, from manufacturing and operating, but also on economics data reported to the appropriate stages of the product manufacturing and operating cycle.

Therefore, the products traditional life cycle is a sequential one that linearly develops from raw material stage to its disuse/ disposal.

Product recovery and recycling has changed this linear evolution in a cyclic one with a product recycling degree (see figure 6).

Conclusions

1. The remanufacturing key points consisting of structural elements of technological equipment are precisely processed in manufacturing stage for a reliable operation and with form and dimensions changes in prescribed parameters.

2. Durability and reliability of those components are leading to a relatively simple remanufacturing.

3. Technological equipment manufacturers whose attribution is also the waste equipment remanufacturing, must make an operated and delivered equipment inventory to create a database which extracting some equipment particular information, before they reach the recycling centers of metallic materials.

4. A database existence which incorporating all technological equipment information is an opportunity for remanufacturing activity.

5. Technological equipment remanufacturing which were not designed to be remanufactured, although this is currently only economical and ecological required interest, is important.

6. Products design decisions can lead to structural variants which have an environment impact at every stage of materials the life cycle.

R E F E R E N C E S

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