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# SELECTED ENGINEERING PROBLEMS

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## PLANNED OBSOLESCENCE – TODAY'S ENGINEERING DILEMMA

**Abstract:** Planned obsolescence (PO) is a policy of planning, designing and manufacturing products with limited serviceable life. It has become an indispensable companion for today's economy, causing a lot of ethical and ecological controversy and stands in opposition to the strategy of sustainable development. The article presents environmental hazards resulting from the application of this strategy, draws attention to the widespread use of PO, with particular focus at the electronics industry. The range of activities and procedures used in the design and manufacture of products resulting from planned obsolescence was described. It was found that this strategy determinates the way of future business, obliging the engineers to design and produce goods according to planned obsolescence guidelines. This strategy brings profits to corporation, not paying attention to consumers and the environment.

### 1. Introduction

One of the today's engineers dilemmas is the selection of appropriate criteria whereby designing and manufacturing of goods will be made. More often manufacturers design their products with using the strategy of planned obsolescence. Planned obsolescence is a purposeful designing and manufacture products with a limited, pre-established time of their functionality. This problem applies to many areas of manufacturing, it is noticeable wherever reduction of durability and suitability of products is possible, which are forcing consumers to buy new goods and ensure cyclic exchange of goods (Fig. 1) [1-5].

The best example that reflects the planned obsolescence problem is a light bulb, a product that began to be manufactured and operated from the time, when Thomas Edison introduced to the mass production the electric light bulb in 1881, which service life at this time was determined at 1500 hours. Modifications of professor Adolphe A. Chaillet, from the beginning of the last century, made it possible to create a filament, that could work in bulb tens of thousands of hours. However, more or less formalized deliberate action of corporations caused that this product in the typical production form for nearly 100 years did not significantly develop, with the result that planned service life of the classic bulb today is only about 1000 hours. Many studies of researchers and improvements in the field of materials engineering involving the manufacture of a better, more durable material were not used in the industry. Modifications of the construction of the classic light bulb filament did not go into mass production, and patents were purchased or put away in safes.

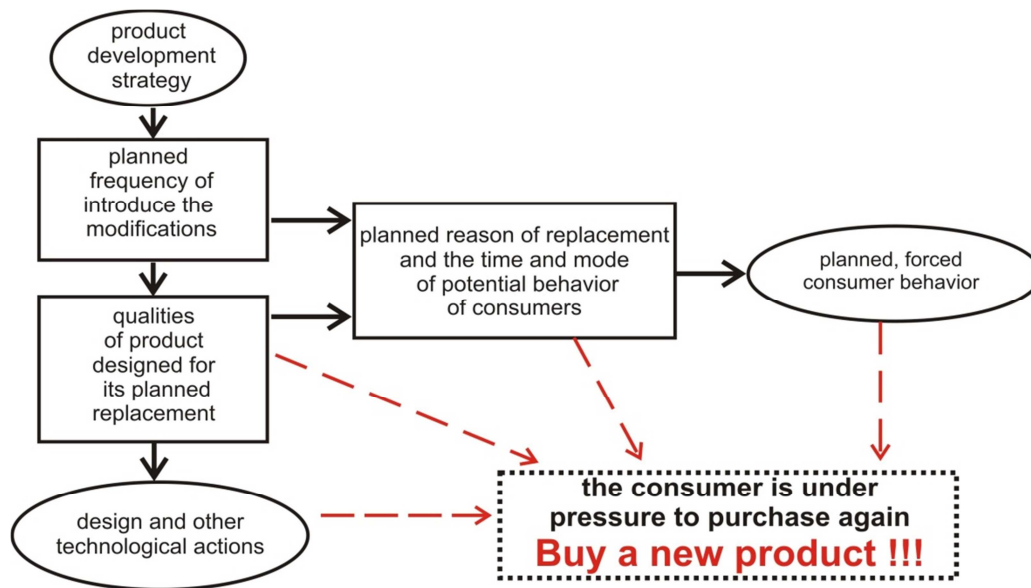


Fig. 1. Planned obsolescence products and its impact on consumer behavior [1]

## 2. Discussions

Many authors consider that the planned obsolescence is carried out by appropriately programmed "anti-features" devices. The idea is that certain elements of the finished products are programmed to stop working after a certain time, or the specified number of actions (usually just after the warranty period). The problems are that many of these treatments is practically impossible to prove, and the manufacturer can always explain by saying that equipment was not used according to the instruction [1-6].

Main practices used by manufacturers which are forcing consumers to replacement old products by new are [1]:

- planning the time of operational service life of product by reducing the durability of their components,
- designing with difficult or a costly repair, (used especially in the electronics industry)
- planning of limited functionality,
- planning the time of new features introduction,
- planned compatibility only with new products (for example: software),
- creating fashion trends among consumer (industrial design, fashion).

Forced replacement of products may occur as a result of legislative changes through the introduction of new, planned temporary regulations for example in the field of environmental protection. All these actions are aimed at stimulating consumption and production growth through faster replacement of old products with new ones [2].

Most of these activities are strictly related to the work of designers and engineers, but often raises a lot of ethical controversy. After all the scientific - technical progress should serve humanity but not bring profits only for corporations. The production of goods using planned obsolescence strategy also negatively affects the natural environment. Among the biggest environmental threats arising from the planned obsolescence it can be distinguished:

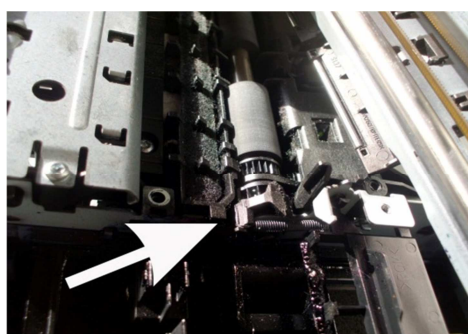
- unjustified excessive consumption of non-renewable natural resources and energy,

- production of large amounts of various toxic chemicals and other waste carrying the threat to life on our planet,
- dispersion of resources by stored old products as a waste to landfill but not recycling them.

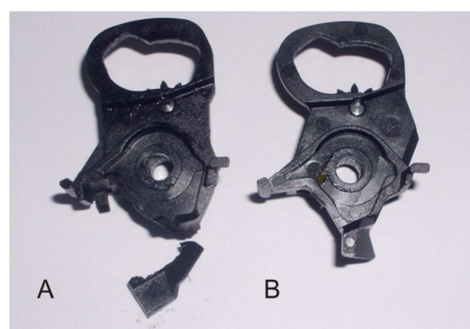
One of the solution that can mitigate the adverse impact of planned obsolescence to the environment is aware of contemporary culture of consumption, which are forcing the manufacturers and designers to adapt their actions to the requirements of the twenty-first century. This may be done by modular design and producing of products, taking into account the changes resulting from the product's life cycle and to facilitate the recycling of the used components. In times of dominant consumption manufacturing of too durable products is unprofitable for companies. The longer the product is working, the less money consumers will spend on it, and that translates into real revenue in the sector. If the durability of the products will be calculated for long period of time, it would be a reason that only a few companies will maintain in the market [5,7].

The strategy of planned obsolescence is also apparent on information technology (IT) in both software and hardware markets. In order to entice consumers to buy the new goods, manufacturers often introduce incompatible or only partially compatible products with planned substitutability of new version, forcing the consumer to purchase the new product [1-6].

A good example for planned obsolescence is the electronics industry, we can often meet there planned service life of products and the designing difficult or very costly repair. Illustration can be ink printers produced by one of the largest manufacturers. For several years they are producing incorrectly designed plastic rollers, thereby these elements prematurely are used up (Fig. 2). After some time of exploitation plastic "prong" (Fig. 3) breaks down, causing immobilization of the printer. New element is not available as spare part, exchange to another even used is economically unjustified. It makes the printer useless and forces customers to buy a new one.



*Fig. 2. Printer roller with visible damaged part*



*Fig. 3. Elements from Fig. 2: A) damaged part, B) good part*

The solution of this problem even for not very experienced engineer should not be a big problem. It can be assumed the inability or more likely a deliberate action and designers unwillingness to remove "constructional defect" causes the demand for new products and formation of waste electrical and electronic equipment (WEEE) [7]. The importance of WEEE recycling has become more evident over the last years. It is expected that quantities of WEEE will increase rapidly in the future. WEEE constitutes 4% of municipal waste in EU.

German citizens gather each year on landfills stream of electronic waste about 1.8 million Mg [8,9]. It is interesting how much of this amount are the products designed and manufactured using the rules of planned obsolescence.

### 3. Conclusion

Strategy of planned obsolescence is contrary to the concept of sustainable development and also does not meet consumer requirements for the quality of the product and the time of their operation. Socially justified sustainable development strategy should be in the future more important driver of innovation and economic competitiveness. Environmental awareness should replace the policy of planned obsolescence and reduce unfavorable environmental impact and improve the quality of life on our planet. Engineers should force socially rational solutions including design and production of environmentally friendly and durable products causing the formation of a minimum amount of waste during the manufacturing, operation and recycling in accordance to the policy of "product and design to minimize the amount of the waste".

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