

Research on Dilemma and Countermeasures of Auto Parts Remanufacturing Enterprises

Sun Yafei

Shanghai University of Engineering Science
China

Abstract

Since the National Development and Reform Commission (NDRC) launched the project of the auto parts remanufacturing pilots in 2008, remanufacturing enterprises' development in our country is not very well. This paper analyzes the dilemma faced with the auto parts remanufacturing enterprises from aspects of sales and circulation, Recycling and production, and policies and regulations. Through systematically analyzing the obstacles hindering the development of enterprise, it will be good for our country's auto parts remanufacturing enterprises to make full use of the advantages and opportunities, convert disadvantages and threats, and promote remanufacturing enterprise developing steadily and sustainably.

Keywords: Auto parts; Remanufacturing; Consumer awareness; Recycling of old parts

1. Introduction

With the improving of the economic level in China, automobile industry has obtained a rapid development in our country. According to the statistics of China's auto industry association, in 2013, the volume of Chinese auto production and sales is more than 21 million vehicles, and the amount of auto ownership has more than 137 million; it is expected that the number of scraped car will be 13 million each year. Implementation of the automobile recycling and remanufacturing is an important measure of energy saving and emission reduction in our country, and it also is an important way to promote the industrial structure adjustment and transformation of the pattern of economic development. However, due to the auto parts remanufacturing industry in China started late, it has not been perfect in many aspects, thus, the development of our country's auto parts remanufacturing enterprise still faces many difficulties so far.

1. Dilemma of Auto Parts Manufacturing Enterprises

1.1 Low Consumer Recognition and Acceptance

According to the research of Shanghai automotive industry fund project (2011), 53% of the respondents (144 questionnaires) have never heard of "remanufacture", and 47% of the respondents (129 questionnaires) ever heard of "manufacturing". As to the understanding of the auto parts for remanufacturing, 90.5% (273 questionnaires) chooses "do not understand", and 0.09% and 0.007% respectively select "basic understanding" and "fully aware". When asked about "ever bought remanufacture parts?", only six respondents among 273 samples answered "yes", that is, 98% of consumers haven't bought the remanufacturing auto parts. When supposed that the quality of remanufacturing products are the same as the original factory accessories, enjoy the same after-sale service as original accessories, and the price is only half of new products, most consumers said they would consider using remanufacturing parts, however there are still 34.2% of consumers do not consider using components for remanufacturing.[1]

Thus it can be seen, consumers of our country exist different levels of misunderstanding on remanufacturing product at present, even hold that "remanufacturing = second-hand + waste reuse", distrusting quality and performance of remanufacturing product.

1.2 Little Number and Low Quality of Recycling Old Parts

At present, the south Korean scraps 700000 cars a year, a second country after Japan to realize the actual utilization rate up to 95%.The United States currently has about 200 million vehicles, scraps quantity of 12 million units, having a perfect car recycling facilities, and 80% of scrapped autos can be reused, recycled, remanufactured and recycling disposed.

However, scrapped autos erosion in our country is serious, and the scrapped car actually recycled every year is only 0.5% - 0.5% of the car ownership amount, far lower than 5% to 5% of developed countries. [2] According to an annual Sampling survey on more than 20 countries remanufacturing pilot enterprises in 2013 from Auto parts manufacturing industry, production distributes in the following table 1. It doesn't up to 50% of the total capacity, and 60% of the enterprises reflect that the old parts are not sufficient.

Figure 1: Auto Parts Remanufacturing Production Allocation in 2013

Product Categories	Production (set)		
	First Half Year	Second Half Year	Total Year
Transmission	26265	34104	60369
Engine	9467	10752	20219
Dynamo	229102	278678	507780
Diverter	71500	95200	166700
Turbocharger	5000	7000	13000
Oil pump	34700	35400	70100
Others	23848	23777	47625

Source: Auto parts remanufacturing industry annual sampling analysis in 2013.

China Association of Automobile automotive parts remanufacturing Branch

1.3 Lack of Tax Incentives

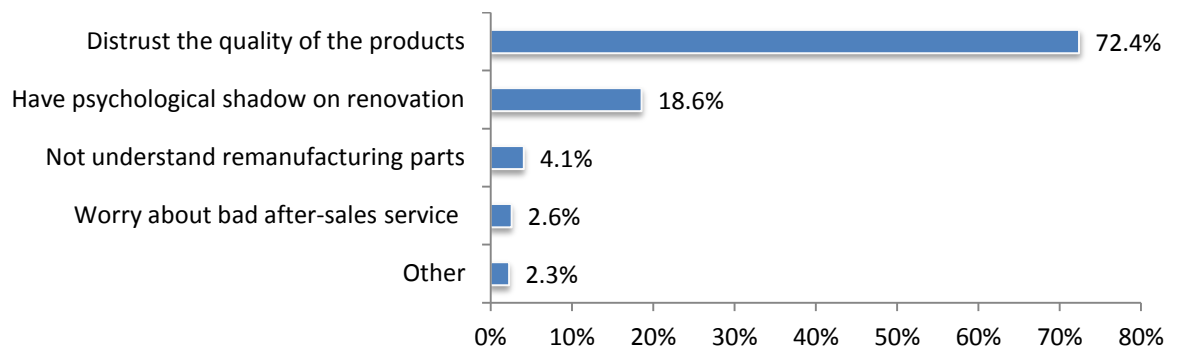
Remanufacturing industry in China started late and market is still in its infancy. Remanufacturing enterprises have yet to form stable economic benefits, to a certain extent, are in a state of micro profit or even loss as a result of the huge initial investment as well as the limitation of production material and product consumption. In 2011, the government began to cancel tax incentives policy on waste materials recycling business. Enterprises will pay VAT according to 17% of the sales amount because of waste materials recycling business cannot obtain input tax. [3] Thus will further increase the product cost. The dilemma of enterprises would further with the actuality that the market does not accept increasing remanufacturing product price.

2. Analysis of Dilemmas in Enterprises

2.1 Consumers have Doubt about the Quality and Service of Remanufacturing Products

According to an Internet survey "Will you buy the remanufacturing auto parts?", worrying about the quality of the products is the main reason of not consider buying remanufacturing parts among the respondents without the intention to purchase remanufacturing auto parts. The specific figure as follows:

Figure 2: Main Reasons for not Buy Remanufacturing Auto Parts



Source: Tencent Automotive. Many factors restrict remanufacturing parts, quality as the focus [EB/OL]. http://auto.qq.com/a/20120213/000262_1.htm

At present, the remanufacturing parts sales channels mainly rely on new product sales channels, has not set up its own sales network, and product sales circulation also face the restriction of relevant laws and regulations and after-sales service. These reduce the acceptance of consumer's perception of the product uniqueness to a certain extent.

Moreover, remanufacturing parts are mainly used in the auto service market, but due to long-term lack of the specification and regulation in Chinese automobile service market, some low-cost illegal renovation/assembled parts are easy to enter, forming "lemon market", limiting the development of remanufacturing enterprise on the terminal market.

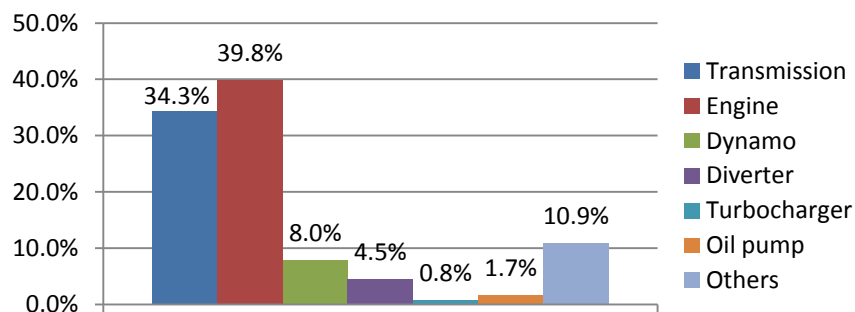
2.2 Remanufacturing Technology Limited

Auto parts remanufacturing production needs to be dismantled, cleaned, detected, classified, the failure parts remanufacturing processed or replaced, product assembled in a specific process, and finally enter the market after strict test. However, due to the automotive remanufacturing industry in China started late, the equipment is relatively backward, remanufacturing cost is high, the burden of enterprises is heavy, remanufacturing industry in domestic still exists a certain gap in technology and quality compared with the foreign counterparts. Although some domestic enterprises have preliminary mastered the key unit technology of auto parts remanufacturing, there still some common basic technology is yet to be researched, such as NDT automation analysis technology, remaining life and the residual stress evaluation technique, micro/nano surface engineering technology, rapid prototyping technology of remanufacturing, and virtual remanufacturing technology and so on.

2.3 The Restriction of Government Policy

According to the article 14 of *Rules of ELV Recycling Administration Measures of the People's Republic of China*, promulgated in June 2001 and used till today, "Among scrapped auto parts dismantled by scrap auto recycling enterprise, "five supervised assemblies of vehicle"(including engine, diverter, transmission, front and rear axle, frame) should be treated as scrap metal, sold to iron and steel enterprises as raw material for smelting." Thus, to an extent, limits the "five supervised assemblies of vehicle" enter the gate of the remanufacturing enterprise. [4] In fact, one of the most values of remanufacturing is precisely the "five supervised assemblies of vehicle" among scrapped auto parts. This policy controls the remanufacturing enterprises to buy old parts as raw materials for remanufacturing only from a fixed users or auto service market, far not satisfying the production and market demand. According to the survey data that remanufacturing single category product output value accounted for the proportion of total value data is as follows:

Figure 3: Auto Parts Remanufacturing Production Allocation in 2013



Source: Auto parts remanufacturing industry annual sampling analysis in 2013.

China Association of Automobile automotive parts remanufacturing Branch

Issued in February 2006, the *Automobile Products Recycling Technology Policy*, clears the Extended Producer Responsibility system, states that auto production enterprises, auto parts production enterprises design and choose renewable materials, use skills and craftsmanship available for recycling use. This requires the original structural design, material selection should be easy to recycle, be convenient for remanufacturing. But this clause is lack of specific implementation measures, not clear in the methods of developing the remanufacturing industry, poor maneuverability.

In 2009, the article 19 to 21 of the *Management Measures of Auto Parts Remanufacturing Pilot* issued by the national development and reform commission, provides remanufacturing enterprise three sources for old components: recycle parts from sales and after-sales service network of their own or authorized companies, from qualified scrapped auto dismantling companies, import foreign old parts for remanufacturing.

But, the terms 24 to 27 of the *Automobile Products Recycling Technology Policy* in 2006 ruling that the old auto components shall not be used to assembly production or maintenance though imported directly or manufactured doesn't synchronous change. This caused policy implementation fuzzy, and enterprises are difficult to get the input tax subsidies.

2.4 The Old Parts Recycling Market is Chaos and Utilization Rate is Low

In addition to the above constraints of national policies and regulations leading to insufficient source of old pieces recycling, old parts recycling and dismantling market being chaos is also a main reason. Formal sector recycles a scrapped car according to the price of recycling scrap metal around \$600 a ton, but when resell a scrap car parts, they can be sold at a higher price than normal scrap prices for several times or more. Some illegal operators are driven by the interests. They disassemble the recycling autos not according the regulation, but sold them to rural or remote areas; or not dismantling the "five big assembly" in accordance with the provisions, but sell them to the lawbreakers used to assemble cars, causing remanufacturing product market quite disorder. [5] According to the China resources recycling association in 2010, data shows nationally designated scrap rate accounted for a third of the total year car cancellation (about 3 million). The remaining automobiles flow to informal channels. There exists a large number of dismantling auto parts flowing through illegal channels into the auto parts market, damaging the consumers' rights and interests seriously.

Moreover, scrap cars are so worn that a lot of old recycling engines can't be used in China and the recovery rate is less than 20%, because the car owners sell the engine to the maintenance station only in the case that engines are damaged seriously or used after a long time. Raw material shortages leads remanufacturing enterprises to mass production difficultly, causing cost of the single remanufacturing product rise and squeezing the enterprise profit space, dismissing the enthusiasm of remanufacturing enterprise.

3. Solution and Suggestions

3.1 Strengthen Technology Research and Development and Ensure Product Quality

Auto parts remanufacturing is a process of using surface engineering and technical transformation to mass repair and the performance upgrade, basing on the blank of recycling auto parts, the analysis of performance failure, life assessment, cost-benefit and the remanufacturing engineering design, and finally make the auto parts quality and performance to achieve even more than the prototype products. So far a lot of key technology in China is not yet mature as a result of automotive remanufacturing in China started late, and the technology research and development cost is high. In order to strengthen the further research of core remanufacturing technology, the government should intensify the support to enterprise R&D, establish platform for mutual cooperation between enterprises, and reduce the initial cost burden of enterprise. Meanwhile, enterprises can joint national research institutions and high schools for research and development cooperation, forming a production-teaching-research combination, and strengthening the transformation between the remanufacturing technology and enterprise benefit. Thus could ensure the remanufacturing product quality not lower than the original ones, win the trust of consumers and achieve self-promotion of remanufacturing product.

3.2 Transform Customer Concept and Guide Automobile Consumption

Although remanufacturing product quality is reliable and the price is cheaper, promotion is of great difficult with low consumer awareness. Government departments, automobile production enterprises and manufacturing enterprises, repair shops, and other forms of canal should be allied to promote the characters of remanufacturing product energy saving, environmental protection and advantage of performance, quality and price, letting consumers know remanufacturing and trust remanufacturing product and technology, so as to guide consumers choosing remanufacturing product during maintenance, cultivating remanufacturing parts consumption market.

The government should also take the lead role. Under the same condition, the government purchasing priority should be given to manufacturing products, such as setting policies, encouraging use remanufacturing product in public car maintenance, sanitation vehicle maintenance, taxi, bus maintenance and other public areas.

Once again, enterprise remanufacture products market access system should be standardize and sales channels should be strictly supervised, avoiding illegal dismantling enterprises and inferior parts into the market, falling consumer recognition of formal remanufacturing product.

3.3 Improve the Remanufacturing Rule Policy System

In order to adapt to the requirement of industry development, government should amend relevant provisions of the Measures for the *Administration of the Scrap Car Recycling* as soon as possible, and change the policy limits on “five supervised assemblies of vehicle” being destroyed mandatorily, allow qualified remanufacturing enterprise to make recycled "five big assembly and parts, broaden the sources of raw materials for manufacturing. At the same time, strengthen the supervision of old auto parts through standard recycling channels, ensuring old auto components enter the qualified manufacturers finally. To carry out the articles in the *Auto Product Recycling Technology Policy* about car design in the original structural and material selection should be available for the remanufacturing, improving old parts availability in vehicle access in the future.

In addition, we should improve relevant technical regulations in the *Technology Specification of Remanufacturing Automobile Parts Products*: clearing requirements of remanufacturing product technical quality, achieving the same function and technical index as new products, implementing certified management on key remanufacturing auto parts and controlling quality of remanufacturing product strictly.

Release the limits of old components import timely. Recommend allowing qualified remanufacturing enterprises to import foreign old engine and other parts used for remanufacturing timely with the condition of satisfying environmental protection, customs regulations and quality supervision, considering the current domestic remanufacturing enterprises lack of materials and the advantages of the low labor costs. Tax authorities should also make and implement the product value added tax deduction policy as soon as possible to promote the development of remanufacturing industry.

4. Conclusions

Overall, auto parts remanufacturing industry in our country is still in its infancy. Government policy, companies operating and consumer market remains to be perfect. The development orientation of auto parts remanufacturing is still based on policies, needs strong support from government. Meanwhile enterprises themselves should increase the actual investment, found remanufacturing industry comprehensively, join multiple strength in establishing consumer recognition and acceptance. Promote multi-dimensional innovation on concept, technology, management system and marketing and so on, get out of the dilemma as soon as possible, and realize the sound sustainable development.

References

- Bu Xinwen, Chang Xiangyun, Yang Hongkai. Research on the consumption characteristics of remanufacturing parts from family car in China[J]. *Auto parts*, 2014(1),34-35.
- Zhao Qinghua, Chen Ming. A comparison of ELV recycling system in China and Japan and China's strategies[J]. *Resource,Conservation and Recycling*,2011(57):15-21.
- Li Aiguo, Li Aijun. Development model and present situation of the scrapped automobiles dismantling industry in China[J]. *China Resources Comprehensive Utilization*, 2012(30):22-24.
- Chen Senchang, Huang Zhiyong, Zhou Zhou Zhengbing. Policy dilemma and suggestions on automotive remanufacturing in China[J]. *Automobile Technology & Material*, 2010(11): 41-42.
- Cai Yong. Present situation and suggestions on scrap car recycling in China[J]. *China Resources Comprehensive Utilization*, 2009(27):6-7.