

Designing Products for Remanufacturing

Traditionally, OEMs have focused their design-engineering efforts on the criteria required to sell new product. This design process has been driven by the following parameters:

- Reduce the cost of manufacturing
- Reduce manufacturing cycle times
- Meet performance requirements
- Meet quality requirements.

Though OEMs do incorporate some additional parameters that recognize post-sales requirements, the traditional OEM focus has been to build it and then sell it. Today 90 percent of OEM revenue is derived from new-product sales, with the remainder obtained from post-sales activities of service/parts, repair, technical training, and others. What if, when designing a new product, an OEM's new-equipment product design engineers were directed to incorporate design parameters that favorably affect the remanufacturing process by

- Minimizing the direct labor requirements of disassembly/reassembly
- Minimizing process cycle times of disassembly/reassembly
- Maximizing the life of not-new-condition parts
- Maximizing the ease of adding future modifications.

Design-engineering efforts can also be directed to negatively affect the remanufacturing process when, for example, an OEM wants to strategically limit the physical life of a product to sell more new products. Such actions can have long-term business implications—but that's another story. This new design strategy could benefit an OEM and its strategic partners by

- Reducing the cost of sales for products and services that deliver the following remanufactured products:
 - Exchange services
 - Rental/operating leases
 - Not-new product sales
 - Customer-site remanufacturing of customer-owned products
 - OEM-site remanufacturing of customer-owned products.
- Reducing the material asset safety stock investment required to meet service-offering demand driven by faster process cycle times.
- Projecting an environmentally friendly image by applying the FTC's approved use of the terms "recycled" and "remanufactured in the USA" to all remanufactured products.

This new design strategy could also benefit product users by

- Increasing the number of products and services that use remanufactured components
- Reducing prices—often by as much as 50 percent to 70 percent relative to new products.
- Increasing the residual values created by using a design that maximizes material recovery rates and extends the product life cycle.

Xerox is one OEM that has truly embraced the design-for-remanufacturing concept. Many of the lessons learned from Xerox can be applied to all sectors of the economy that are involved with remanufacturing. Below are a few of the highlights of Xerox's efforts.

- For the last decade, Xerox has pursued an aggressive program in which design-for-remanufacturing has been included in new-condition equipment design-engineering.
- Xerox has focused design-for-remanufacturing efforts on its high-end copiers and printers. These items are primarily delivered to customers on a pay-per-use basis whereby the customer purchases a bundled operating lease/maintenance/supplies offering with a fee schedule determined by the number of pages produced.
- As the remanufacturing business plan evolved at Xerox, several internal issues had to be addressed. Two of the more complex issues were
 - Establishing accurate product costing when mixing new and not-new-condition parts when re-assembling a product for a lease offering
 - Managing the reverse logistics supply chain of impaired products that are inducted into the remanufacturing process.
- The impact of the migration of Xerox to digital technology is currently negatively affecting the residual values of older copiers and printers under lease. Instead of being remanufactured for future operating leases, returned products are now being distributed to secondary markets where they are sold as not-new-condition products.

Seeing Tomorrow

- The environmental movement and the business community will find a common objective in remanufacturing—pollution prevention and higher corporate profits—and the federal government will become a catalyst for OEM design-for-remanufacturing through the use of tax incentives.
- Equipment users will not care whether a product is new or remanufactured .as long as they obtain the utility and reliability that they expect from a product. Product users will focus on solutions rather than mere products.