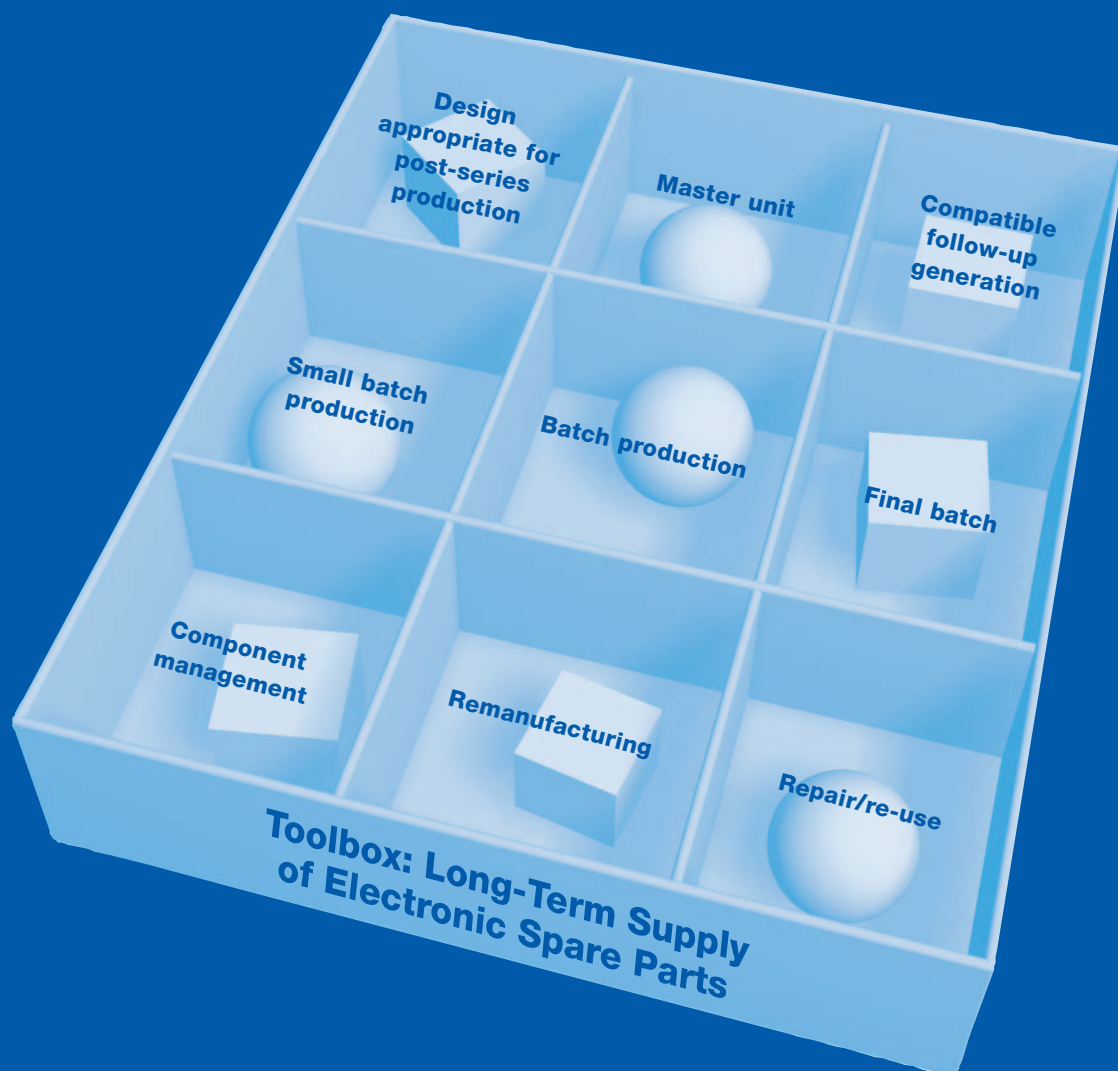


Technical Information

Electronics – Special Manufacturing



Ideas today for
the cars of tomorrow

Special Manufacturing

Modern vehicles are defined in terms of power capacity combined with economy, comfort and a design in line with environmental requirements. As a result of the increasing integration of electronically implemented functions the value of the electronics share in vehicles has increased significantly in the past few years and will continue to increase in future, too. The high innovative speed of semi-conductors supports the economical realisation of market requirements.

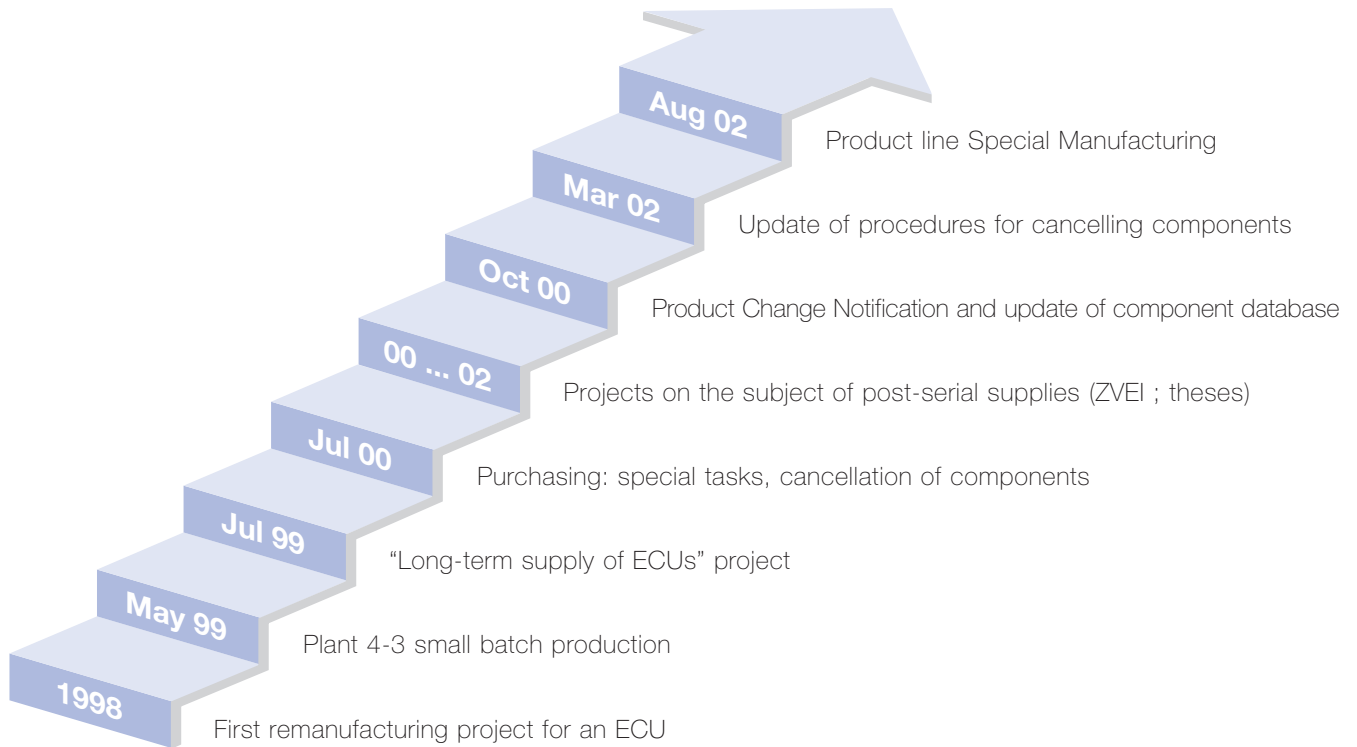
The speedy innovation desired by the automotive industry and necessary for competitiveness is a direct contradiction to the requirements of long-term supply. Innovations are mainly driven by mass markets such as information technology, for example. These markets are characterised by their short product life cycles. The semi-conductors required for these are produced using continually new methods. The automotive industry cannot utilise the capacities of out-of-date manufacturing facilities economically and thus cannot guarantee the long-term supply of electronic components.

Guaranteeing all functionalities even in older vehicles is only possible through the long-term supply of spare parts and ensures customer satisfaction in the long-term, too, and with it the competitiveness of vehicle manufacturers.

The supply of electronic components during post-serial supplies requires individual supply strategies and coordinated component management. The main task of the Hella product line "Special Manufacturing" with its own development and production facilities is to draw up economical solutions to safeguard component supply.

History

Hella has already developed modules that place the continuous build-up of secure long-term supply of electronic spare parts on a solid basis.

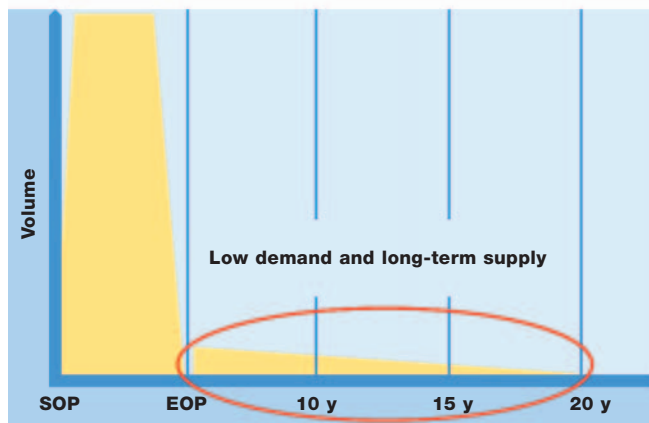


Development of post-serial supplies at Hella

- Building up a comprehensive component database gives development engineers at Hella the necessary certainty of only using components that are available in the long-term.
- Thanks to the cancellation management process already well established, all those affected by component cancellation are informed as early as possible.
- Installing a separate area of responsibility in Purchasing has concentrated the know-how for supplies of cancelled components in one place.
- The economical production of spare parts in small batches requires different basic conditions than those for mass production. For this reason, Hella installed a flexible small batch production plant in 1999.
- The foundation of the product line "Special Manufacturing" in the Electronics business division focussed responsibility for long-term supply of ECUs in terms of
 - Production
 - Development (product updates)
 - Strategic alignment.

Problematic nature

Typical annual spare parts volume is 0.2–1% of the number of ECUs currently in the market. In certain cases this value can even be significantly higher.



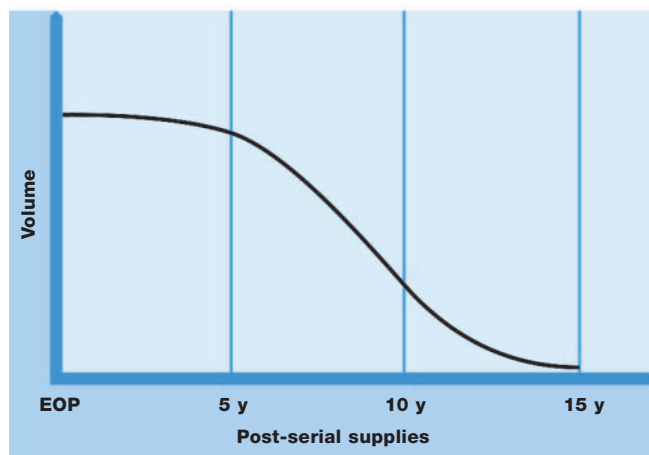
ECU demand during life cycle (automotive)

The extremely low post-serial volumes in comparison with the series volumes make different production strategies and facilities necessary.

The extent of fluctuation of post-serial volume is a clear indication of the necessity for an individual volume scenario for every ECU. Drawing up forecasts is only possible if close cooperation with the customer takes place.

The long period of post-serial supplies requires specific measures for safeguarding component availability and functional ability of production facilities.

The demand for post-serial spare parts falls considerably in the long-term.



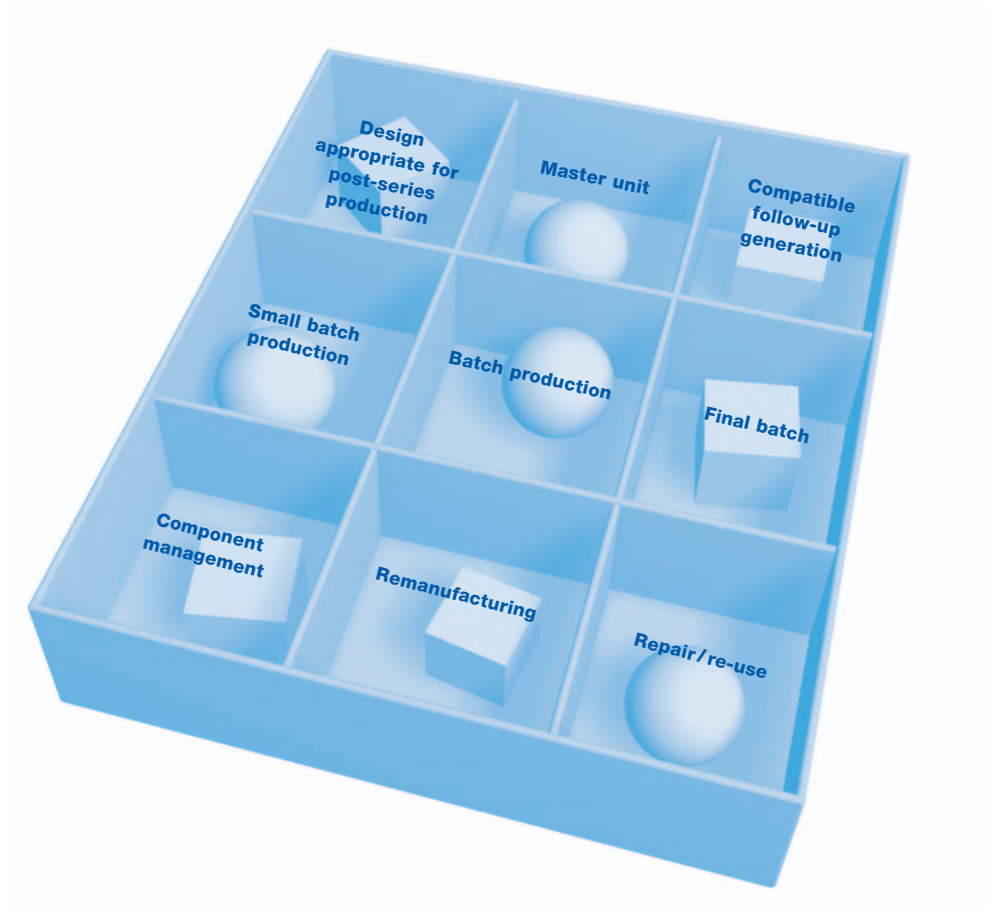
Qualitative curve for post-serial demand

Unit-specific supply strategies

Cost-optimised long-term supply of spare parts is influenced by various factors. The overall volume to be expected in the long-term, the availability of the components and unit-specific design are of particular importance.

Based on a volume scenario agreed with the customer, Hella prepares a supply strategy which aims to achieve optimum supply reliability and costs. The supply planning takes both unit-specific data and customer demand into account and utilises the individual tools from the long-term supply tool box.

Significant deviations from the post-serial volume forecast or component cancellations lead to revision of the supply strategy. Only planned and actively controlled post-serial supplies can secure economical long-term supplies of ECUs.



Tool box: long-term supplies of electronic spare parts

Design appropriate for post-series production



Master unit



Compatible follow-up generation



Small batch production



Batch production



Final batch



The development of ECUs is not only guided by aspects of safeguarding functionality and permanent functional safety, but also by the cost aspect. These basic conditions can result in solutions for series production unit designs that contradict optimum post-serial supply concepts (e.g. welded housing). Hella takes the requirements of long-term supply into account already during product development for new ECUs and clarifies contradictory requirements in dialogue with the customer.

Master units can cover the functionalities of different unit versions that have been created as mass produced units in order to achieve optimum costs. Master units lead to a reduction of the variety of units on stock and in production. In terms of overall costs, the master unit can represent the cost-optimised solution for the supply of spare parts, even if the individual unit itself is the most elaborate member of the product family involved.

The use of compatible follow-up generations can cover the post-serial supplies of predecessors. It is even possible to update the software if necessary.

Production at regular intervals satisfies continual demand. The production facilities are not dismantled after production.

The products are only produced with long intervals between. The production facilities are dismantled after production and put into storage, making the production area available for other products.

The final batch is the absolutely last production batch of a certain product. The final batch is produced following agreement with the customer. Subsequently the production facilities are scrapped unless an agreement has been made to the contrary with the customer concerning the testing equipment.

Component management



One of the main focuses of safeguarding long-term supplies is on the extension and updating of the component database. If a component is in danger of imminent cancellation it is blocked for new development, and all those affected are automatically informed without delay following component cancellation.

Remanufacturing

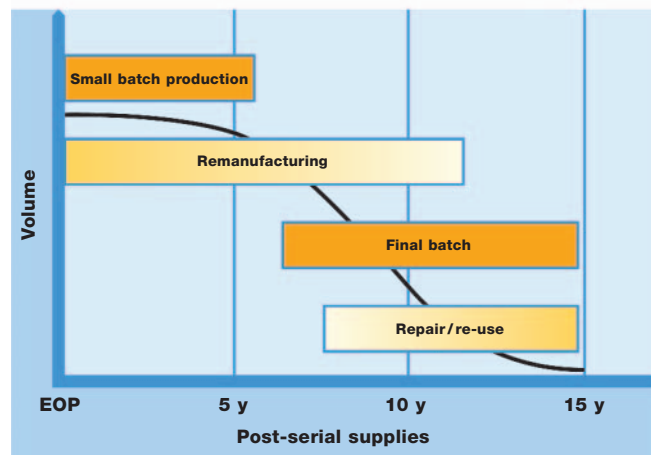


The remanufacturing process produces as-new spare parts (replacement parts). The quality standard is guaranteed through the general replacement of wearing parts and other components agreed in advance. The definition of critical components is made in close cooperation with the product development engineers and using know-how from manufacturing and quality assurance. Clearly defined processes and end-of-line test using series equipment are characteristics of remanufacturing.

Repair / re-use



In contrast to remanufacturing, the repair process includes individual fault analysis and repair of the faulty components. The units undergo functional tests according to a testing procedure agreed with the customer. The requirements of this testing procedure deviate from that for series units. If the used units provided are no longer suitable for repair, units procured on the independent parts market can also be checked for functionality. Repair and re-use makes the supply of reasonably priced spare parts possible, particularly during the fade-out phase.



Possible combination of manufacturing processes during post-serial supplies of electronic spare parts

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