End of Life Vehicle Regulations and Automotive OEM Specifications Requirements for Product Content Reporting—Influence on a Tier 1 Automotive Supplier

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Automotive Original Equipment Manufacturers (OEMs) worldwide have mandated product content reporting from their suppliers as a result of European End of Life Vehicle (ELV) regulation. The suppliers at all levels have gone through a steep learning curve, and are still striving to comply. Lear Corporation, a major Tier 1 supplier to automotive OEMs, has taken many steps to integrate this requirement into its main process. The cost of compliance is significant. However, the available data is helping Lear to better understand product content and make product improvements for environmental reasons. The paper covers these aspects and the current state.

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Introduction

Historically, the automotive industry in the United States has shown responsibility toward environmental protection by systematically eliminating the materials and substances that are harmful to the environment from their products. Such hazardous materials and substances are referred to as substances of concern or SoCs in this paper for ease of reference. Since many supplier companies besides the Original Equipment Manufacturers (OEMs) are involved in manufacturing an automobile, OEMs had to ensure that none of the suppliers' products contained any SoCs. OEMs developed appropriate in-house specifications and contractually mandated suppliers to comply with these specifications. Since 1984, auto manufacturers have required non-compliance notifications from suppliers.

Such reporting was manual, and was done using a predefined form provided by respective customer. Suppliers were required to notify OEMs, if the products supplied contained any of the SoCs listed in customers' specifications. Such customer specifications generally classified SoCs into three separate categories – Regulated or Banned, in consideration for regulating or Restricted, and on the watch list by regulators or Reportable. If suppliers did not submit any non-compliance notification with other required data for part approval, OEMs considered these parts compliant.

By mid 1990, in order to facilitate recycling of the used parts, OEMs started promoting recycled materials usage in automotive parts. To better understand the extent of recycled materials usage, OEMs required suppliers to report not only non-compliance to their SoC specifications but also the usage of recycled materials in their products. The SoC specifications, meanwhile, were regularly updated by the OEMs with latest substances and materials of concern.

During this period, many of the automobile companies were becoming truly global companies by either merging or acquiring the automotive companies in different parts of the world. Automobiles were designed in one region, and manufactured and marketed in multiple regions. Product specifications existing at the United States automobile manufacturers transformed into global specifications to meet requirements existing in different parts of the world. Major Tier 1 suppliers followed the globalization trend to become local with their customers.

In September 2000, the European Union (EU) adopted a directive, 2000/53/EC[1] of the European Parliament and of the Council to minimize the impact of end-of life vehicles (ELV) on the environment, to protect, preserve, and improve the quality of the environment and energy conservation. This directive defined specific target dates for OEMs to certify that their products do not contain certain hazardous substances and meet required recyclability and recoverability targets. The directive also requires OEMs to take their products back for recycling at no cost to the last owner. Key points of the directive are depicted in Fig. 1. In 2003, Japanese auto manufacturers voluntarily agreed to adhere to a law very similar to the EU ELV directive.

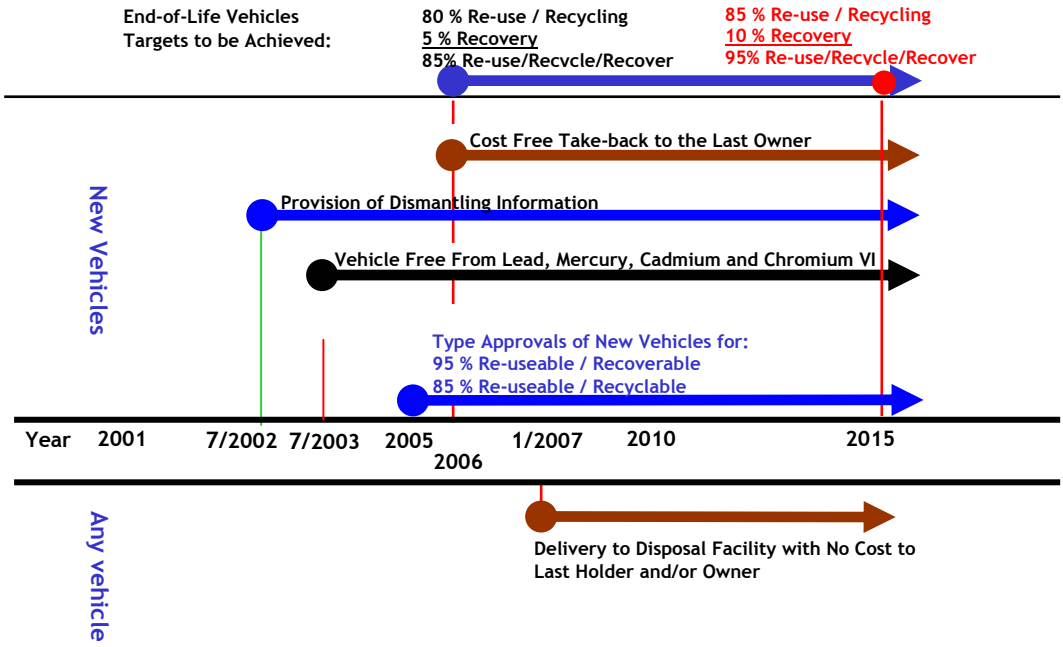

Fig 1. Key Target Deliverables from EU Directive

Measures and Methods of OEM Compliance

Although the ELV directive was adopted by EU, its impact was global. Many products designed and developed in the US are marketed in EU, and vice versa. Since most of the OEMs are global and had global specifications to develop their products, the requirements of this directive were included in their global specifications. Customers have made these requirements global as they want to have the flexibility to market their vehicles in any part of the world at any given time. Suppliers that had no-EU business in turn had to comply with these requirements to meet customer specifications.

Every OEM must obtain type approvals from European Country Governments before marketing their vehicles in Europe. For such type approval, the OEMs are required to submit recyclability data, hazardous substance certification, and a disassembly manual to the European governments. In addition to reporting for Type Approvals, customers have to eliminate any substances of concern that may be present in their vehicles. They must also increase the recyclability of their products to meet the targets given in the directive. Currently, vehicles are about 70% recyclable by weight. Non-compliance to this requirement in Europe could mean no-sales of vehicles in those markets and fines for non-compliance.

In order to comply with all these requirements, the OEMs have to have data on each material used in making their automobiles. Without such data, certification for type approval will be

difficult. Since most of the parts assembled in an automobile today come from supplier companies external to OEMs, they have to rely on suppliers for such data.

Although this directive was adopted in 2000, the discussions on directive's impact on the industry, data collection method, and compliance method were in progress among the European OEMs for sometime. In 1996, a few OEMs in Europe came together to develop a data collection tool that would be practical and efficient. This effort resulted development of a web based data collection tool known as 'International Materials Data System' or IMDS in short. Although this tool was developed by a few European OEMs, today OEMs from around the world are using this system to collect data from their suppliers.

The data flow in IMDS matches that of material flow in the industry. For example, in order to make a simple front seat in a car, first, raw materials to make basic seat components such as foam, cover, and frame are needed. These raw materials then formed into different basic components. These finished components are assembled into the final product, a seat. Similarly, in order to construct a data sheet for a seat in IMDS, the first piece of data required must come from raw materials suppliers. Such data is then transformed into parts data by adding part weights and other details. IMDS data sheets of these sub-parts are then put together to form a data sheet for the final seat assembly. The OEMs collect data coming from all different suppliers, and eventually put together material content data on a complete vehicle.

The automotive industry has a quite long and complex supply chain. The direct suppliers to the OEMs are known as Tier 1 suppliers. Suppliers to a Tier 1 supplier are considered Tier 2 suppliers to OEMs and so on. In some cases, Tier 1s can be Tier 2s or Tier 3s and the Tier level can be as deep as Tier 7. However, Tier 1 suppliers are held responsible to gather and certify all sub-tiers' data since OEMs mainly interact with Tier 1 suppliers. Thus, the majority of the data collection and certification work is transferred to Tier 1 suppliers.

Early Years of Reporting at Lear Corporation

Non-compliance certification statements were being sent to OEMs. Lear, as most of other suppliers, and the OEM themselves, were not requiring complete product make up disclosure from their respective supply base. The approach had to be changed at Lear to address revised customer requirements. Initial requests from customers were for reports on specific vehicle lines by specific target dates.

The reporting method and tool were new to the industry, and compliance timing was short. Lear, therefore, had to adopt a process that would get data from suppliers and provide report to customers on time. First of all, Lear Purchasing informed its suppliers of this requirement. Lear has more than 160 manufacturing sites worldwide, and providing training to all locations in short time span was not feasible. To expedite the compliance, Lear kicked-off the process with a centralized reporting group as system skills and technical competency were not available at each location.

Internal data collection was as critical as the data from suppliers. Lear grew from many acquisitions. With these acquisitions came different systems to maintain product data. The central group had to interact with each affected Lear location to get the needed data. This data was sorted to get a list of parts and suppliers contact information. A typical process is depicted in Fig. 2. A standard data collection request package was developed to send out to suppliers. This package included detailed instructions on submission, certification, form, and parts list. Also Lear used existing penalty (scoring) system to track non-compliance.

Suppliers needed time to get familiar with the new reporting method and tools. To assist suppliers, Lear adopted two ways of data collection from suppliers, one through IMDS system and the other one through a simple excel based spreadsheet. The thought process here was that the suppliers would find it easier to fill out an excel form rather than working with a new web based database. The first year of data collection took a great deal of discussion and training for the sub-suppliers. Getting complete and acceptable data on any given part took anywhere from two weeks to 16 weeks. The delay was mainly due to the fact that data was not readily available, and the requirement was not reaching the lowest tier supplier in the required fashion. Many industry associations took on the task of holding conferences for suppliers to make them aware of this requirement and importance of this to the industry.

Data received from the suppliers were reviewed against Lear requirements for acceptance. The data was rejected if the requirements were not met. The data coming through the excel form needed more attention than the data received through IMDS. Final assembly trees were then constructed in IMDS manually using the Bills of Materials of respective products, and data from suppliers. These data sheets were then submitted to OEMs for approval. This reporting method grew into one of the major processes within the organization, touching almost every department. The reporting requirement to affected Lear in two ways – money spent on reporting and efforts expended in changing parts with SoCs.

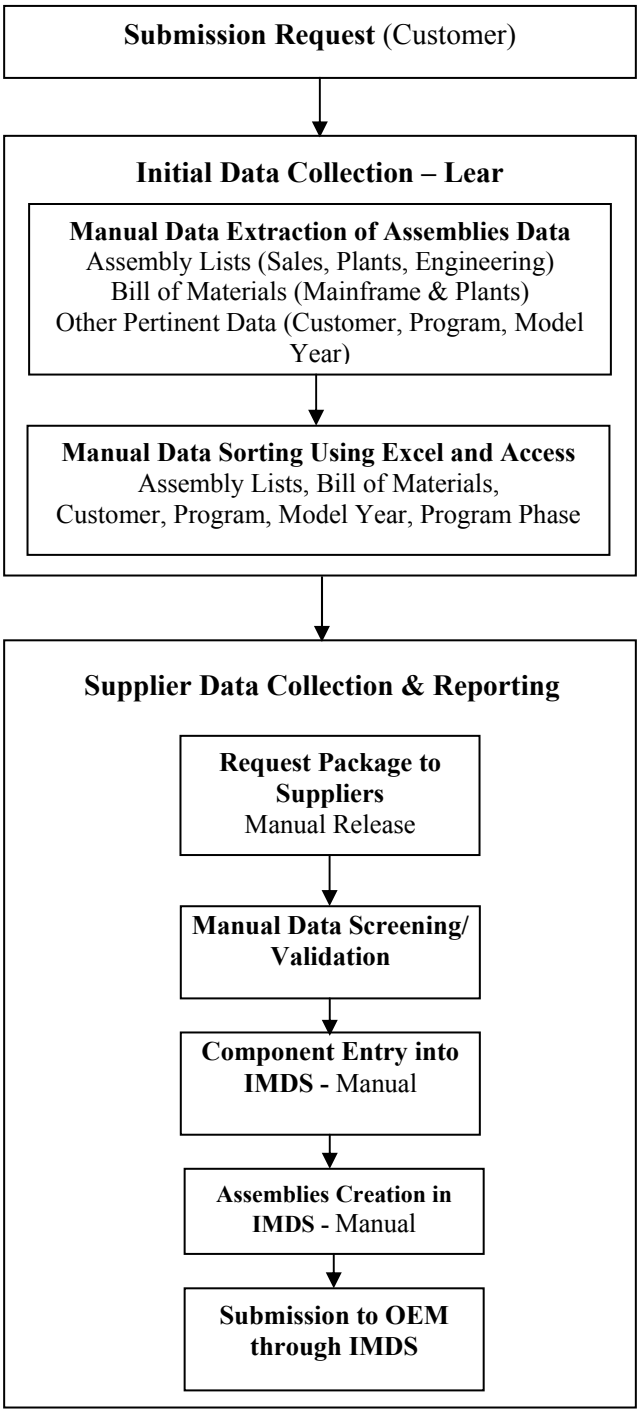

Fig. 2. Initial Data Reporting Process

Process Changes to Improve Compliance

In order to improve the efficiency of the reporting process, improvements were put in place. Operations in the process were automated. The new process is shown in Fig. 3.

Data Collection

The excel spreadsheet used for the data collection was changed to an 'intelligent' spreadsheet to perform quality checks on suppliers' data while entering in the form at suppliers' locations, and to electronically link this data to internal bills of materials (BoM). By early 2002, many variations of such spreadsheet were used in the industry to collect this data. Lower tier suppliers having multiple customers had to deal with many spreadsheets. To eliminate this confusion and to standardize the requirement, in second quarter of 2002, Automotive Industry Action Group (AIAG) came forward to support this tool for the industry. Lear uses AIAG supported spreadsheet today.

BoM Data Transfers

Various software programs were written to get the required data from different BoM systems that Lear has. This eliminated human intervention in BoM data handling.

Data Storing

Data collected from all the suppliers are now stored in an internal secure database accessible through Lear intranet for Lear locations worldwide.

IMDS Data Upload and Download

BoMs and supplier data coming to Lear through spreadsheets could now be electronically sent to IMDS and data coming to Lear through IMDS could be downloaded into Lear's internal database electronically. Since all the product data is now internally available, product improvements are better managed.

Part Approval Process (PPAP)

Part approval at Lear now requires suppliers to submit evidence of IMDS submission with their Part Product Approval Process (PPAP). This reduces the burden of data collection on the central group, and makes the associates responsible for part approvals the gate keepers. Compliance cost is thus lowered.

Product Change Process

If any of the current products contain SoCs, the affected program team works with customers, engineering, purchasing, manufacturing, and suppliers to make the required changes.

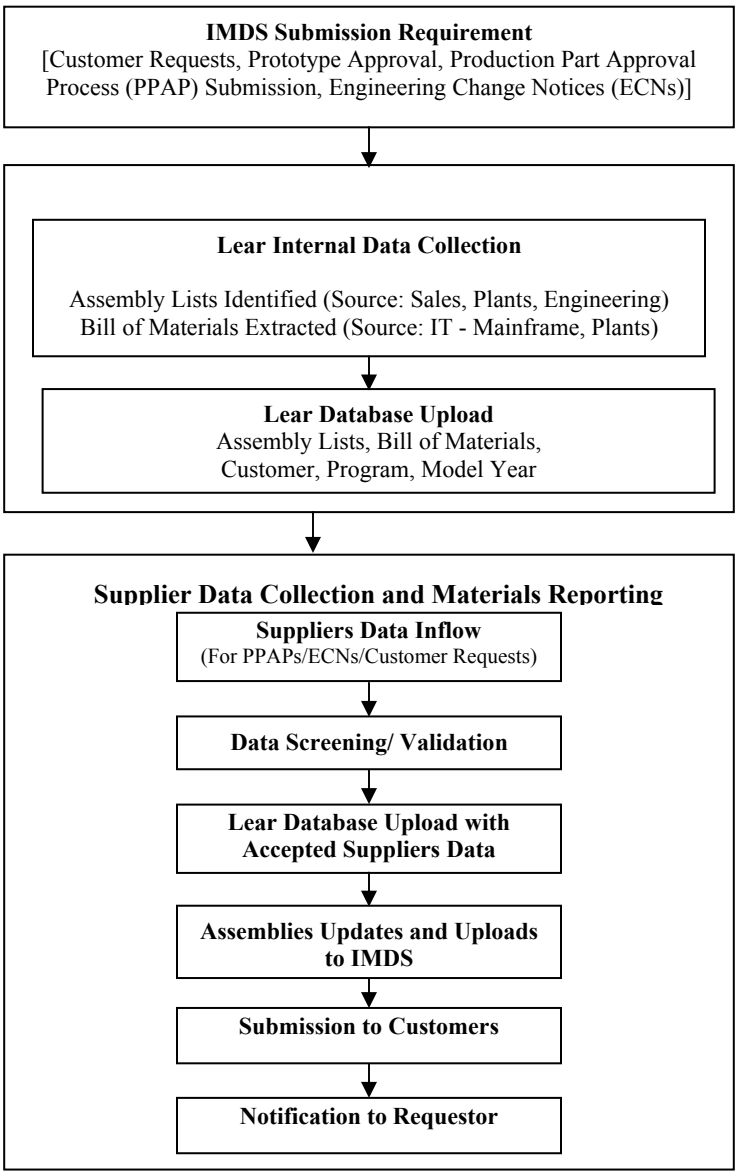

Fig. 3. Revised Data Reporting Process

New Product Development Process

Product Engineering is responsible to verify materials for compliance and have this data from the suppliers while developing a product. This ensures that product is compliant and materials data is available when needed. Advanced quality planning personnel monitor suppliers' progress on this requirement well ahead in the program timing.

Purchasing Contracts and Supplier Requirement Manual

Lear's purchasing contracts and supplier requirement manuals are updated to clearly specify this requirement to suppliers. Suppliers from the beginning now know that this requirement must be met.

Penalties for missing the submission timing

Suppliers are assigned scores through Supplier Rating System, if they fail to provide the data by requested timing. This rating negatively affects suppliers rating, and influences future business and 'best supplier' awards.

Benefits from the Reporting Process

Lear is realizing many benefits from this reporting process. Lear engineers understand the product make up better. Such understanding helps in designing products with better materials. The data collected on Lear products is used in identifying SoC containing parts and suppliers. Lear can now easily generate list of parts containing a given substance as well as the list suppliers supplying components containing any SoCs. This task could have been very difficult a couple of years ago. Lear is currently working on eliminating hexavalent chromium from corrosion resistance coatings and lead from solders using data available internally.

Part recyclability is easily calculated from the available data to support customer requests. Understanding part recyclability is essential in devising methods to meet the recyclability targets set by the customers. Recycled materials usage in Lear products is also readily available as a result of this effort. The OEMs are strongly encouraging recycled materials usage in automotive components where and when feasible. This approach is taken to minimize amount of materials that reaches landfill and at the same to create a market for recycled materials.

Many Lear plants are considering using the materials data for their environmental reporting. Since this global database has product data from different parts of the world and can be accessed globally, engineers have the opportunity to cross-learn product make up from different parts of the world, and design environmentally sound products.

Conclusion

As a major Tier 1 supplier in the automotive industry, Lear has seen many changes in its business process due to ELV regulation. The revised requirements put forward by the customers are adding cost to the way of doing business. However, this requirement is here to stay. As a customer focused company, Lear has incorporated many changes in its business process to support this new requirement, and has been successful in getting the data to customers. As an incentive from this effort, Lear now has the capability to better understand its product make up and design in environmentally sound improvements.

References

1. Official Journal of the European Communities, "Directive 2000/53/EC of the European Parliament and of the Council of 18 September2000 on end-of life vehicles," p. L 269/34 (2000)

