Solutions Supporting Environmentally Conscious Business

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The corporate world has become environmentally active to comply with regulations and meet voluntary targets. In Europe, regulations concerning chemical materials in products have been stepped up, requiring exporters and companies that make up their supply chains to become involved in environmental activities. At the same time, some companies have come to see that environmentally conscious products can help make a company more competitive and are incorporating environmental activities in management. As the scope and volume of a company's environment-related business continue to expand, more companies can be expected to introduce environmental business solutions with the aim of making environment-related business more efficient and creating mechanisms for applying environmental information to management activities. This paper describes functions required of environmental business solutions and the effects of introducing them divided into three fields: Environmental Management System (EMS), support for environmental-load reduction activities for places of business, and support for environmental-load reduction activities for products.

1. Introduction

Companies are being asked to reduce the environmental load generated in the course of their business activities in the form of global warming countermeasures, waste recycling measures, chemical materials countermeasures, etc. Regulations concerning chemicals in products have even been stepped up in recent years. Typical of this trend is the RoHS Directive[note 1)] and REACH regulation[note 2)] in Europe that require more than just the environment department of a company to get involved. From the viewpoint of environmentally conscious products, close cooperation is now required among many departments including the design, purchasing, manufacturing, quality control, and sales departments. Such directives and regulations also have a big effect outside the company on business relations throughout the supply chain. Environment-related business is therefore broadening in scope while also increasing in sheer volume. At the same time, departments in charge of environment-related business have a strong desire to apply information technology more effectively to process a wide range of data more efficiently and accurately.

From here on, both domestic and international regulations that surround the corporate world are likely to be expanded even further, and we can expect to see even more companies

note 1) Stands for "restriction of the use of certain hazardous substances in electrical and electronic equipment", an EU (European Union) directive banning the use of certain harmful substances in electric and electrical equipment.

note 2) Stands for "registration, evaluation, authorisation and restriction of chemicals", an EU regulation that requires manufacturers and importers of chemical materials to register and evaluate those chemicals beforehand.

energetically promoting environmental activities either with the attitude that "taking on the environment is one way of becoming more competitive" or as part of their corporate social responsibility. Against this background, Fujitsu has been providing environmental business solutions since 1999 in support of environment-related business in the Environmental Management System (EMS) field and core business fields.[1)]

This paper describes environmental business solutions that support environmentally conscious business in companies with a focus on manufacturers.

Table 1
Supporting tasks for environmental business solutions.

2. Supporting tasks in environmental business solutions

The Fujitsu Group has promoted activities toward reducing environmental load in individual places of business and individual products in addition to conducting company-wide environmental management activities. Based on environmentally conscious business know-how accumulated through these activities, Fujitsu has developed environmental business solutions divided into three main fields: EMS, support for environmental-load reduction activities for places of business, and support for environmental-load reduction activities for products. There is also a need for the results of analyses that associate environmental information with management information to be applied to environmental activities. Supporting tasks in environmental business solutions provided by Fujitsu are summarized in **Table 1**.

Sections 2.1–2.4 describe solutions supporting EMS, place-of-business activities, and product-development activities as well as solutions for visualizing environmental information.

2.1 Solutions supporting EMS

EMS is a mechanism for constructing a plan-do-check-act cycle at the management level and continuously improving environmental activities based on the ISO14001 international standard. Solutions supporting this field include third-party certification-support consulting services targeting ISO14001, Eco Stage,[note 3)] etc., environmental document management systems, environmental management information systems, and e-learning. There are an increasing number of companies that would like to collect environmental performance data more efficiently and use it more effectively to do their part in combating global warming. The following describes SLIMOFFICE EX,[2)] an environmental management and information system supporting environmental performance management and environmental accounting tasks.

When environmental performance data or environmental accounting data generated by on-site departments is collected, there are many cases in which requests will be passed down the organizational ladder from the headquarters environment department to the office coordinating department and from the office coordinating department to the on-site department, as shown in **Figure 1**. There are also more companies defined as group companies both within Japan and overseas. This calls for workflow functions that can input data and obtain approval at each level and issue reports to the next higher level.

In many companies, the headquarters en-

note 3) EMS-related private standard promoted by the Eco Stage Institute.

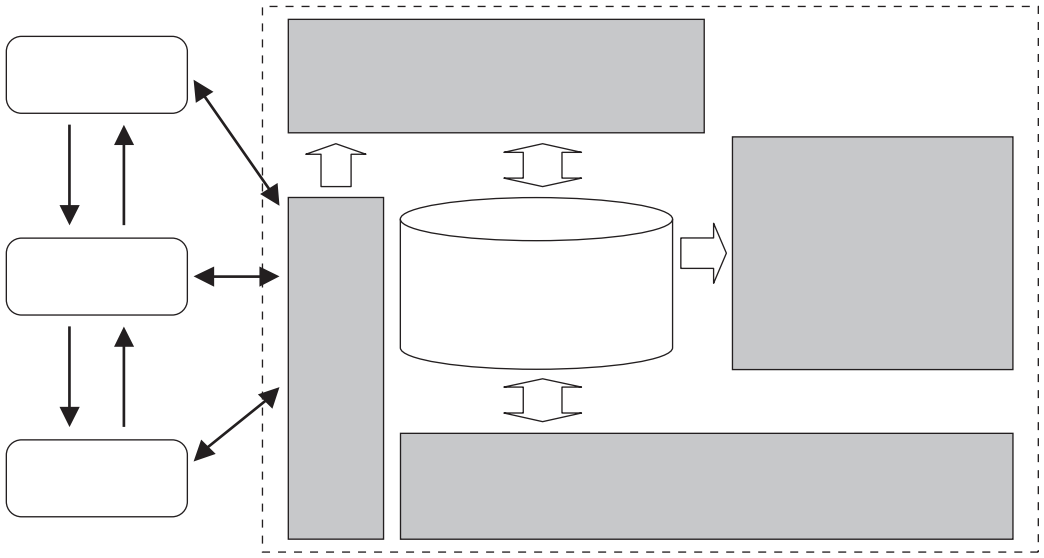


Figure 1
System configuration of SLIMOFFICE EX.

vironment department distributes and collects template-type Excel tables as a data-collection tool to and from on-site departments. This scheme has had problems, however, such as the inability to collect data by the designated deadline and the Excel table format being changed at the on-site department. Collection frequency has also been increasing from annually to semiannually, quarterly, and monthly depending on the type of data collected, resulting in an ever increasing data-collection burden.

It is also expected that collected data will be tabulated and analyzed and that conclusions will be reached in a timely manner in accordance with the needs of each department so that each on-site department can be given guidelines regarding daily activities with the aim of reducing its CO_2 emissions.

This environmental management and information system can help make such data collection and tabulation/analysis tasks more efficient. Its main functions are listed below.

1) Data collection request, input, report, and progress management functions
2) Data tabulation and analysis functions (provide templates for analyzing ten types of environmental management indexes)
3) Various Excel table management functions for data collection and other purposes (existing Excel tables may be used in their present form)
4) Database management functions (Excel tables can be referenced at the cell level)

SLIMOFFICE EX can simplify work management at on-site departments having old Excel tables, make the work of tabulating and analyzing data at headquarters more efficient, and facilitate the application of analysis results to the improvement of on-site activities. (For details about SLIMOFFICE EX, see "FIP Environmental Solutions and Greenhouse Gases Observing Satellite GOSAT" in this issue.)

2.2 Solutions supporting place-of-business activities

In a place of business like a plant, various types of environmental load are generated as a result of production, distribution, and other activities. There are solutions that support the reduction of such an environmental load. These include a total management system for industrial waste that enables uniform management of industrial

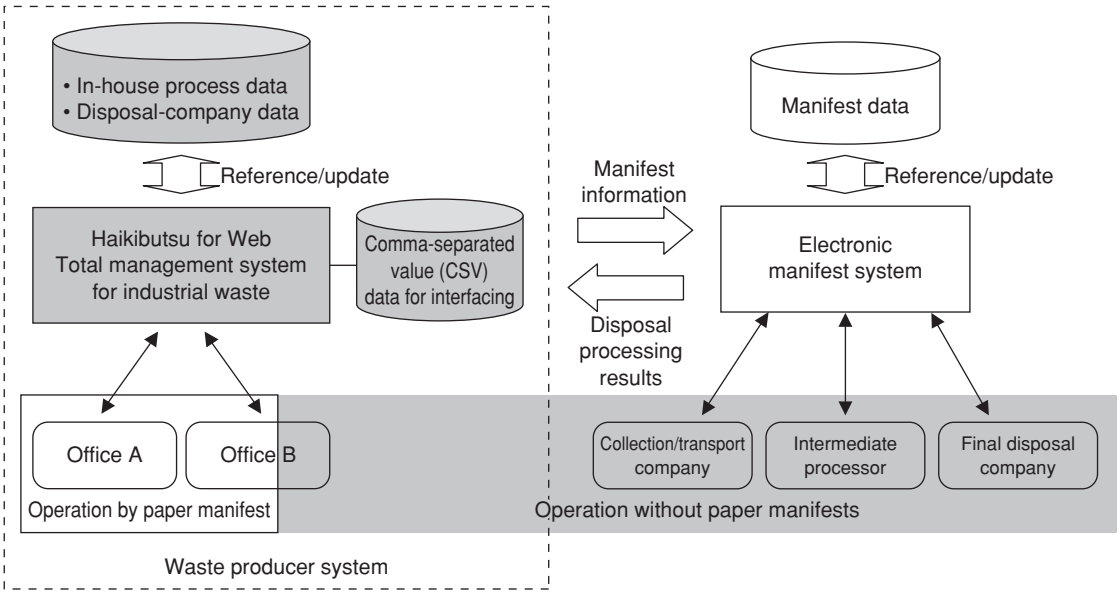


Figure 2
Total management system for industrial waste and linkage with electronic manifest system.

waste toward zero emissions and a CO_2 emissions calculation system that simulates the amount of CO_2 generated by transport trucks and other factors in the distribution process.

2.2.1 *Total management system for industrial waste: "Haikibutsu for Web"*[3]

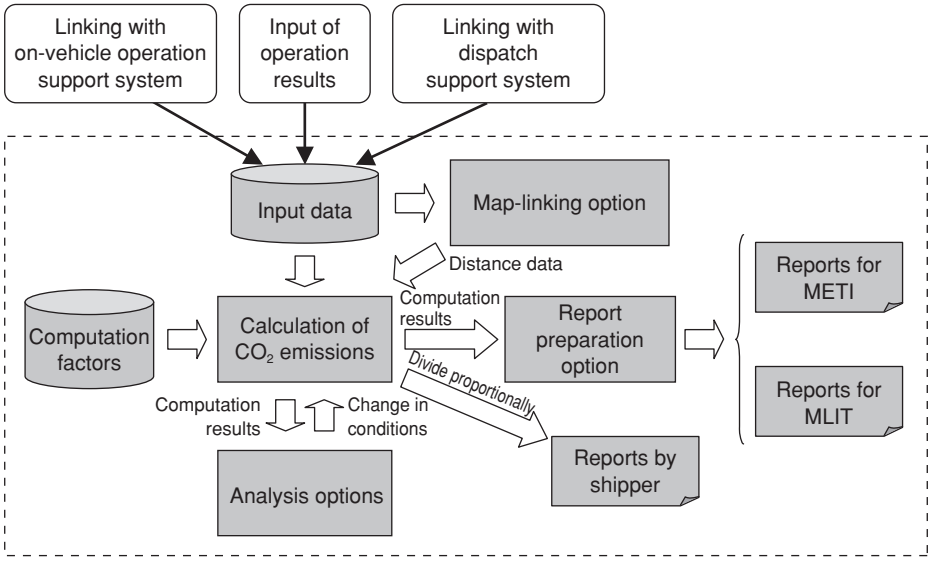
Companies that produce waste have been required since 2006 to report to the conference of governors on the status of issuing industrial waste management manifests that are used to verify proper disposal of waste. These manifests may also be in electronic form, and a usage rate of 50% for the electronic format by 2010 has been set as a government goal. These developments reflect expanding needs with respect to waste management operations.

The main functions of this system are 1) registration processing (input of manifest results, input of general waste, input of in-house processing results, etc.), 2) manifest information processing (manifest printing, collection management, vendor information management, valuable-resource sales management, etc.), and 3) output processing (various types of data output, preparation of Form No. 3 reports, linking with electronic manifest system, etc.).

The benefits of introducing this system include more efficient company-wide operations through uniform management of waste/byproduct quantities and disposal-company information and greater risk avoidance by storing information on the collection of manifests. This system and its linkage with the electronic manifest system are outlined in **Figure 2**.

2.2.2 *CO_2 emissions calculation system LOMOS/EC*[4]

With the revision in 2006 of the Energy Saving Law in Japan, certain transport companies and shipping consignors are now required to report on energy-saving plans and measures. This system calculates the amount of CO_2 emissions based on the quantity of goods transported and prepares reports for submission to government agencies. It includes basic functions (calculation of CO_2 emissions, display of calculation results by consignor and by calculation method, etc.) and optional functions (output of reports for government agencies, map linking, analysis, etc.).



METI: Ministry of Economy, Trade and Industry
MLIT: Ministry of Land, Infrastructure, Transport and Tourism

Figure 3
Operation of LOMOS/EC system.

By providing quantitative information on CO_2 emissions, this system can be used to help shipping consignors establish emission countermeasures such as adopting a modal shift in transport or adjusting shipping frequency. The operating concept of this system is shown in **Figure 3**.

2.3 Solutions supporting product development activities

Companies are working to reduce environmental load throughout a product's life cycle in terms of energy-saving measures, 3R design (reduce, reuse, recycle), chemical materials used, and other means. In parallel with the issuing of the RoHS Directive and the enactment of the REACH regulation, customers are making stronger demands for environmentally conscious product development. There are various solutions supporting product development activities. For example, there is an environmental information management system for making the work of green procurement and environmentally conscious design more efficient. There is also a Responsible Care (RC) support solution centered on the preparation and management of material safety data sheets (MSDSs) required for chemical product management. Furthermore, there is a solution supporting the life cycle assessment of products. The following describes the environmental information management system and RC support solution.

2.3.1 Environmental information management system PLEMIA/ECODUCE[5)]

Companies have been surveying and managing the chemical materials used in their products on a voluntary basis, but the burden of collecting that data from vendors has been great. On top of this, the European RoHS Directive targeting electrical and electronic products was issued in July 2006. As a result, companies that export products to Europe and companies making up their supply chains have been busy setting up mechanisms for surveying and managing the state of regulated chemicals in each of their products. Europe has also issued an End of Life Vehicles (ELV) directive that regulates specific chemical materials in automobile products. The enactment of the

REACH regulation in June 2007, moreover, has significantly expanded the range of targeted products and the types of chemical materials targeted for regulation. These developments are expected to have a major impact on many Japanese companies that export to Europe or belong to those supply chains. This system, which supports the creation of mechanisms for managing constituent chemical materials in products, features the following functions.

1) Product information management (based on design/component tables)
2) Various search schemes (by unit/component, reverse expansion, etc.)
3) Survey management (management of surveys sent to vendors, management of replies to customers, etc.)
4) Regulation management (management of each country's regulations, customer procurement standards, etc.)

In addition to functions oriented to the electrical appliance and machine industries, this system provides an "Automotive Edition" oriented to vendors in the automobile industry. This edition features support for the Japan Automobile Manufacturers Association (JAMA) format and optional support for the International Material Data System (IMDS). The system also supports the Article Information Sheet (AIS) promoted by the Article Management Promotion Consortium and the MSDSplus format. This system supporting the REACH regulation is outlined in **Figure 4**. It can manage the main materials that make up a product as well as auxiliary materials such as paint and plating. Therefore, it can help speed up the distribution of surveys to vendors and the receiving of replies from customers and it can be used to select environmentally conscious components and materials at the design stage.

2.3.2 RC support solution

When a chemical material regulated by law is contained in a product, the producer must provide an MSDS that describes to the customer the danger and toxicity of that substance and handling guidelines. In 2006, revision of the Labor Safety and Sanitation Law made it a requirement to prepare and issue MSDSs based on the Globally Harmonized System of Classification and Labeling of Chemicals (GHS) recommended by the United Nations. This made the revision of the existing MSDS preparation system an urgent necessity in the chemical industry.

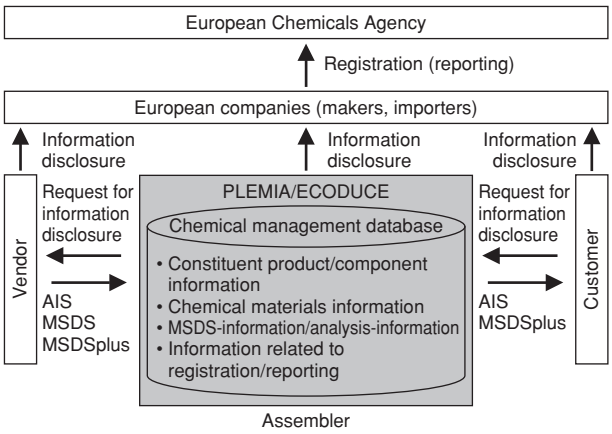


Figure 4
Outiline of system supporting REACH regulation.

This development, together with the enactment of the REACH regulation, is requiring that the management of chemical materials be all the more accurate. The RC support solution features the following functions.

1) GHS classification support (automatic classification of chemical materials and products)
2) MSDS preparation (automatic preparation and distribution management of MSDS)
3) Product label preparation (automatic label creation)
4) Chemical material management (constituent material management, green-procurement surveys/replies)
5) Others (preparation of yellow cards, etc.)

This system can make RC operations more efficient by automating the preparation of GHS-conforming MSDSs for various types of products. The process flow from GHS classification to MSDS

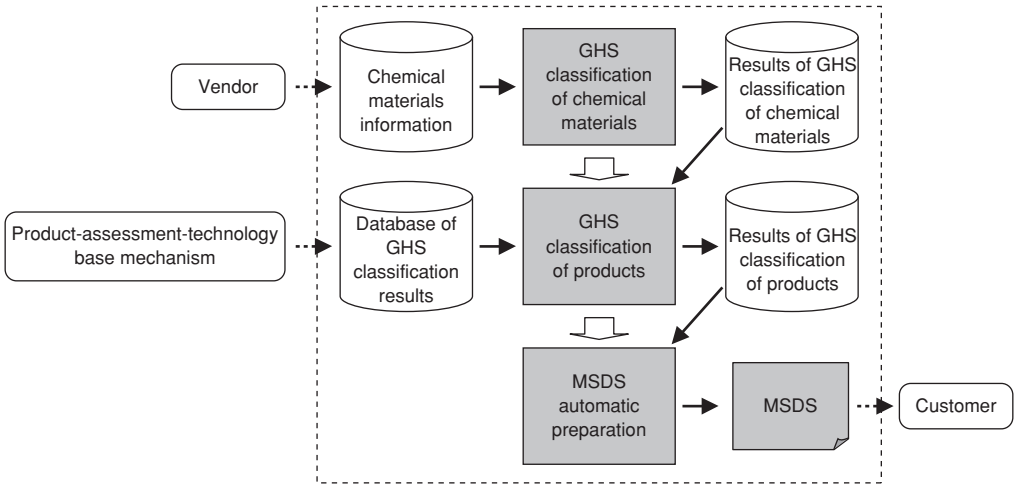


Figure 5
Flow of MSDS preparation.

preparation is shown in **Figure 5**.

2.4 Solution for visualizing an integrated database for environment-related business

Many systems in a company, including environment-related business systems, contain environment-related information. There is a need to associate environmental information resulting from environmental activities with management information stored in core business systems, analyze those associations, and assess the effects of environmental investments and the degree to which environment-related business has been made more efficient. The following introduces this solution for visualizing an integrated database for environment-related business.

Traditionally, data had to be collected beforehand according to the type of analysis to be performed. This, however, required time-consuming coordination with related departments, which prevented analysis being performed in a timely manner. This solution, in contrast, gathers environment-related information interspersed in company systems and stores it in a database in extensible markup language (XML) format, enabling it to be managed centrally. The solution makes use of a high-speed search engine "Shunsaku" to provide a mechanism for efficient analysis that can accommodate changes in regulations and any issues in the environmental field. This solution has three main features: data collection (stores existing data in an XML-based database), high-speed searching (by the Shunsaku high-speed search engine), and display of analysis results (easy-to-understand displays of search and analysis results). It is outlined in **Figure 6**.

3. Conclusion

This paper introduced solutions for environmentally conscious business focusing on companies involved in manufacturing. As can be seen from the expansion of global warming, we have entered an era in which a company's production activities and its manufactured products themselves can have a big effect on the global environment. Looking to the future, Fujitsu hopes to make extensive contributions to corporate environmental management by providing solutions for environmentally conscious business.

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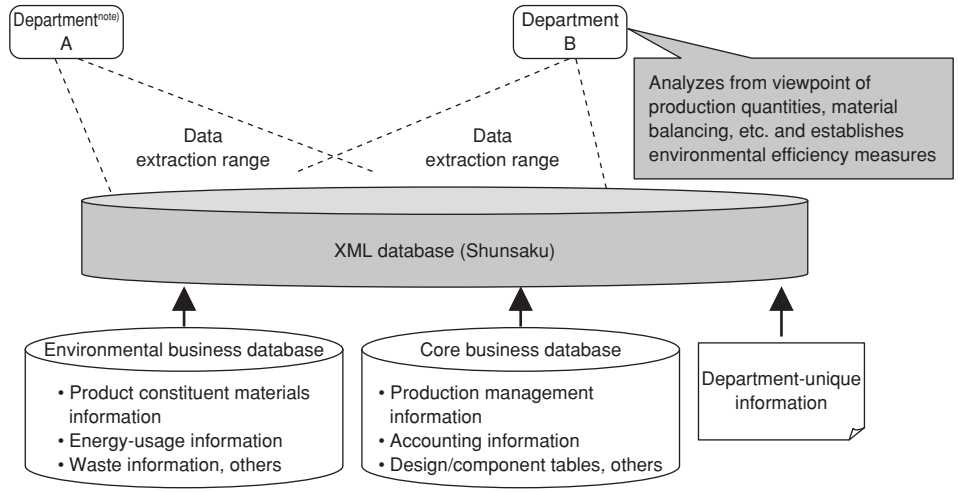

note) Design department, quality assurance department, production department, purchasing department, environmental department, etc

Figure 6
Outline of solution visualizing integrated database for environmental business.

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