Restrictions of Use for Certain Hazardous Substances in Electrical and Electronic Equipment, Outlook of Compliance Management System

Hiroshi Ogata Yoshiaki Kanai

The restrictions of use for certain hazardous substances in electrical and electronic equipment, currently being promoted primarily in the electrical and electronics industry, is moving from the "Planning and Consideration" stage to the "Application and Execution" stage. Businesses in Japan are accelerating their activities to eliminate the applicable chemical substances even more.

Many corporate internal issues had to be resolved by individual businesses in order to promote such activities, such as the lead-free solder mounting technology, as well as the evaluation of alternative materials that contain no cadmium or hexavalent chromium. In addition, surveys on the contained chemical substances have been conducted with suppliers, in order to verify and ascertain that component materials and parts purchased from external vendors do not contain the applicable substances in quantities above standard values. The enormous resources invested in such investigations and the improvements to the reliability of data, as well as the effective use of such data for the purpose of compliance with regulations have become issues for the entire industry.

The current status and future outlook of the management of information on chemical substances contained in products at Oki Electric will be described in this paper.

Current industry status of management for chemical substances contained in products

Regulations on the chemical substances contained in products, enacted primarily in Europe, have apparently been established with an intention for preventing environmental pollution and resource depletion (**Figure 1**).

In response to such developments, the Japan Green Procurement Survey Standardization Initiative (JGPSSI), an industry organization in Japan, prepared a Joint Industry Guide (JIG), which is a guideline for the disclosure of information relating to chemical substances contained within electrical and electronic products, in collaboration with the Electronic Industries Alliance (EIA) of the United States and the European Information & Communications Technology Industry Association (EICTA) of Europe, thereby establishing guidelines to unify investigation methods on applicable substances and suppliers.

Furthermore, a tool and format for collecting responses of investigative surveys on chemical substances contained in products for the purpose of operating according to the aforementioned guidelines were formulated and disclosed by JGPSSI[1]. The disclosure of information throughout the supply chains of products is anticipated to be smoother and efficiency improved within the entire industry through the use of such items. Version three is the current survey response tool used for determining threshold values for content densities of substances, based on the laws and regulations of major overseas nations and regions or within Japan. The format facilitates an easy pass or fail determination for the purpose of regulatory standards.

Such management of chemical substances contained in products is considered to be suitability determined at a

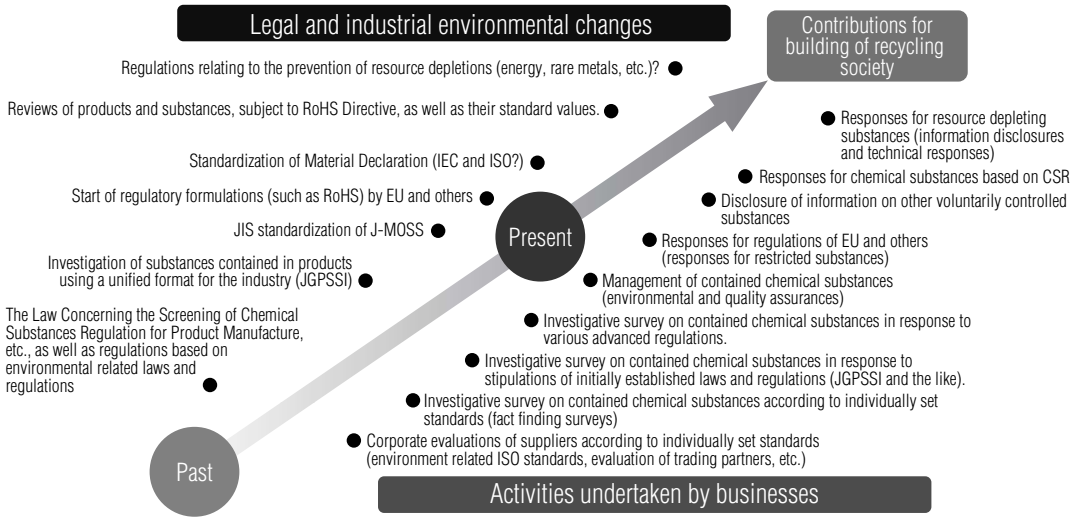

Fig. 1 Management scenario by businesses of chemical substances contained in products

desk, which primarily involves the design stage (selection of materials and parts) and therefore, cannot be considered adequate as information for guaranteeing non-containment of applicable substances in products at the time of shipping.

Consequently, the "Guidelines for the Management of Chemical Substances in Products" was released at the same time as the latest JGPSSI survey format, Version 3. These were proposed as "Guidelines for the Management of Chemical Substances in Products (Draft)" by the Working Committee for Researching Certification Systems for Controlling Information Regarding Chemical Substances Included in Products, established with the support of the Ministry of Economy, Trade and Industry in March 2004. On receiving this draft document the JGPSSI added information, such as explanations including specific examples and standards, for conformity determinations. JGPSSI then issued the updated document under the title of "Guidelines for the Management of Chemical Substances in Products". In order to ensure reliability of the information regarding the presence of chemical substances in products the guidelines indicate a summary of the management system that should be in place within companies with supply chains, including material manufacturers through to set manufacturers[2)].

Individual companies of the industry are striving to maintain management systems that are suitable for their corporate internal processes, starting with the collection of information on the contained chemical substances to the planning and design, through to the product shipping processes, with a full understanding of the aforementioned situations. Since the additional investment of large resources are needed in order to conduct ideal management for securing assured compliance, however, it is expected to take a substantial amount of time before such activities become firmly rooted in the industry as a whole and to function effectively.

Current status of management tools for chemical substances contained in products at Oki Electric

Oki Electric has established and is operating an information system in a database that incorporates survey information on chemical substances included in procured parts and materials, performing simulations and providing user reports (referred to internally as "COSMOS") by taking advantage of core technologies of the company, such as information and communication and involving a framework, which encompass the entire group of companies. Information provided by this system is used to improve operating efficiency relating to product design reviews and reports to users, as well as a part of the information for guaranteeing compliance to regulations and requests. The main functions of this system (environmentally conscious product design support functions) are described below (**Figure 2**).

① Tabulation and simulation functions

The tabulation of chemical substances contained in products, computation and registration for products designed internally, identification of regulated parts and materials, output of tabulation result files, preparation of reports and generation of survey formats for yet to be investigated parts.

② Survey investigation and response to chemical substances

The generation of survey formats for transaction partners, responses for surveys, management of progress and survey files.

③ Chemical substance management

The management of controlled chemical substances, material data and contained chemical substance quantities.

④ Alternative Coordination with other systems

The accommodation of various formats (JGPSSI and individual formats) and interfacing functions with design tools (PDM[*1)], CAD[*2)], ERP[*3)], etc.), etc.

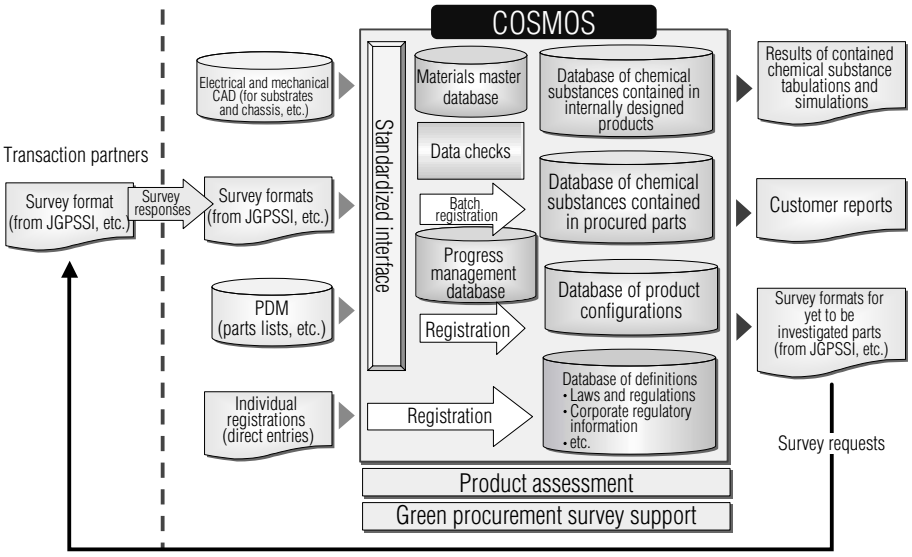

Fig. 2 COSMOS

*1) PDM stands for "Product Data Management"; *2) CAD stands for "Computer Aided Design"; *3) ERP stands for "Enterprise Resource Planning".

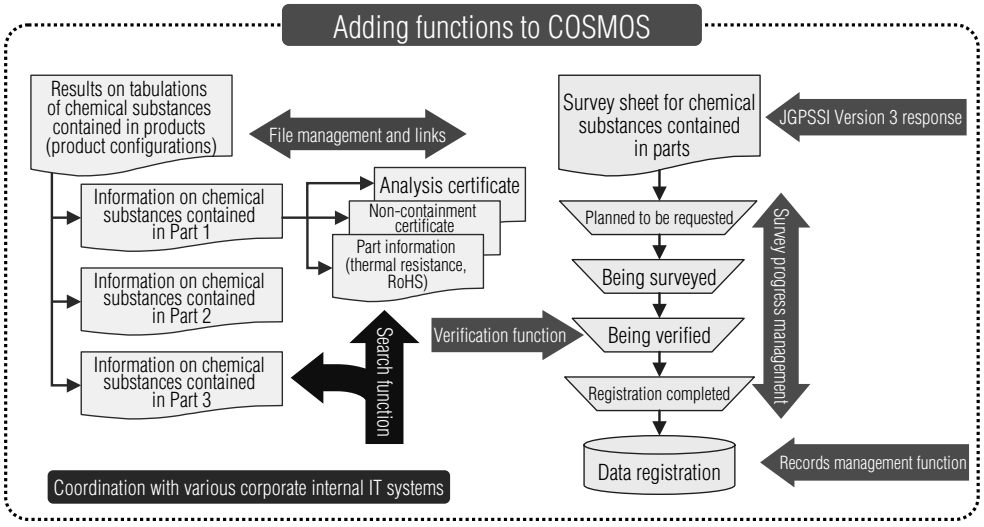

Fig. 3 Adding functions to COSMOS

Furthermore, a revised format for the survey from JGPSSI, as well as various operational improvement functions, have been added as the latest functions to the system. The principal additional functions are described below (**Figure 3**).

① Accommodation of the JGPSSI Version 3 format
② Setting of values for various regulations (including regulations on the purpose and objective of use)
③ Contained chemical substance survey progress management function
④ Contained chemical substance survey data verification function
⑤ Contained chemical substance survey additional data management function (analysis results, non-containment certificates, etc.)
⑥ Various search functions

Examination of compliance tools for regulations on chemical substances contained in products

Oki Electric has been responding to the primary issue regarding information on the chemical substances contained within products in the design stages and reporting to customers by establishing and operating the aforementioned corporate internal IT system. However, although proprietary management systems relating to chemical substances contained in products have been established and operated for a portion of product businesses for the purpose of guaranteeing compliance with regulations on chemical substances contained in products, which is the secondary issue, an enormous amount of human resources are still required in business processes, primarily in procurement and manufacturing.

Table 1 Outline of IT conversion requirements for management of regulatory compliance guarantees

Guidelines for Management of Chemical Substances in Products (JGPSSI)			Examination items for systematization
1. Policy			
2. Formulation of plans	2 - 1	Identification of needs and requirements, as well as clarification of management scope	
	2 - 1 - 1	Clarification of legal, customer and other requirements	● Set and inspect legal and customer requirement management standards
	2 - 1 - 2	Clarification for scope of management	● Set management processes and applicable substances
	2 - 2	Formulation of targets and plan of operational processes	● Tabulate performance of total elimination plans, etc.
	2 - 3	Clarification of organizational structures, roles and responsibilities	● Set authorities for managers, etc.
3. Implementation and operation	3 - 1	Operational management	
	3 - 1 - 1	Design and development	● Simulate and output DR requirements
	3 - 1 - 2	Acquisition and verification of substance containment information	● Display legal and customer requirement management standards
	3 - 1 - 3	Purchase control	● Verify green procurement, survey and data
	3 - 1 - 4	Manufacturing process	
	3 - 1 - 4 - 1	Acceptance verification	● Enter and inspect acceptance inspection data
	3 - 1 - 4 - 2	Process control	● Enter and inspect data on substances contained in materials
	3 - 1 - 5	Change management	
	3 - 1 - 6	Verification for shipping	● Enter and inspect shipping inspection data
	3 - 1 - 7	Responses for non-conformities	● Inspect product tabulation data
	3 - 2	Management of human resources (education and training)	● Set authorities of managers, etc.
	3 - 3	Documentation and document control	● Manage and inspect product tabulation and registration data
	3 - 4	Communication (sharing and provision of information)	● Set and inspect legal and customer requirement management standards
4. Evaluation of performance and improvements (verification of implementation status and improvements)			● Inspect product tabulation data, etc.
5. Management review (review conducted by corporate management)			● Tabulate performance of total elimination plans, etc.

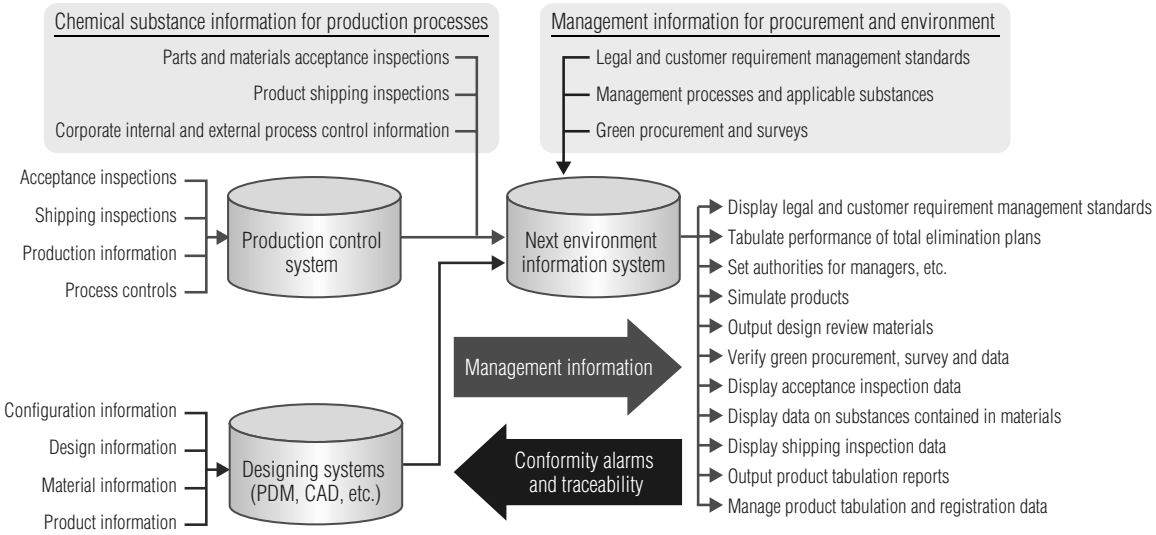

Fig. 4 Coordination with other corporate internal information systems

Described below are the results of examinations regarding corporate internal IT systems that were consequently conducted for the purpose of improving the efficiency of corporate internal resources.

The fundamental management system for the operational model was set following the addition of proprietary requirements to the "Guidelines for the Management of Chemical Substances in Products" issued by JGPSSI. An outline of the IT information that accommodates individual requirements is shown in **Table 1**.

It is necessary to add the following conditions and information to the existing "COSMOS" in order to manage such information. An outline of coordination with the respective systems is shown in **Figure 4**.

① Coordination with inspection and analysis instruments

Manage information relating to acceptance and shipping inspections.

② Coordination with production control systems

Coordinate purchase controls, manufacturing processes, process controls and traceability information, etc.

③ Automatic generation of compliance declaration statements regarding management organizations for chemical substances contained within products

This function will be based on the regulatory stipulations of the Guidelines for the Management of Chemical Substances in Products issued by JGPSSI.

④ Coordination with other systems

Coordinate with corporate internal and external parts and material databases.

It is believed that early realization of this system will contribute greatly towards improving corporate internal human resources and the reliability of information relating to chemical substances contained in products.

Future outlook of corporate internal environmental information systems

Environmental information systems are considered to be essential backbone systems for improving management and environmental quality, as well as for averting business risks. However, it is necessary for corporations to conform their management systems and IT systems to regulatory reviews and enhancements, which are being performed one after another.

Consequently, it is believed that it will be important to properly capture the trends of legal and customer requirements both domestically and overseas, as well as establish systems that are extremely versatile and flexible, for such corporate internal environmental information systems in the future. Furthermore, in terms of consideration for the benefits to corporate management, the scale as well as national and regional coverage of suppliers, cost and reliability simulations, based on assembly and workability along with life cycle assessments, will become critical requirements for building the next IT systems. Contributions toward advancing environmental management, including the respective elements of quality, cost and delivery, are expected through the establishment of such systems.

References

1) Japan Green Procurement Survey Standardization Initiative: Guidelines for Standardization of Material Declaration
http://210.254.215.73/jeita_eps/green/green2.htm

2) Japan Green Procurement Survey Standardization Initiative: Guidelines for the Management of Chemical Substances in Products
http://210.254.215.73/jeita_eps/green/green8.htm
(English version: http://210.254.215.73/jeita_eps/green/green8-eg.htm)

Authors

Hiroshi Ogata: Global Environment Div.

Yoshiaki Kanai: Oki Techno Creation Co., Ltd., Design & Development Dept.-4