Current Situation of Web-Based Chemical Registration System in The University of Tokyo

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The web-based University of Tokyo Chemical Registration Information System with computational support has been introduced in all areas using chemicals owing to the unified management of the university and the management of chemicals in conformity with legal controls. This system enables chemical users to manage chemicals easily and reduces the burden inflicted by such management. In this report, we introduce the style of chemical management in the University of Tokyo, the functions of the web-based chemical registration system, the current situation of the system and future plans.

1. Introduction

In present-day society, tens of thousands of chemical substances are used and hundreds are newly developed each year.(1) Chemicals are inseparably linked to daily life, although some chemicals have hazardous properties. Therefore, if chemicals are not managed appropriately in such processes as manufacturing, distribution, use and waste treatment, human health and the environment will be exposed to harmful chemicals.

On the basis of such awareness, the strict management of chemicals is strongly advised to sustain a safe and secure society: thus, governmental regulations on the management of chemicals have been further strengthened. In Japanese national universities, associated with independent corporations, the Occupational Health and Safety (OHS) Law in addition to previous legal controls began to be applied in the fiscal year 2004.

In the University of Tokyo, which is a huge research institute, for storing and using vast

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numbers of chemicals, a web-based chemical registration system with computational support was introduced in all areas of the university using chemicals owing to the unified management of the university and the management of chemicals in conformity with legal controls. This system enables chemical users to manage chemicals easily and reduces the burden inflicted by such management. In this report, we introduce the functions of the web-based chemical registration system, the current situation of the system and future plans.

2. Introduction of UTCRIS

The web-based chemical management system is named the University of Tokyo Chemical Registration Information System (UTCRIS). UTCRIS was developed as a unique management system based on a general chemical management system. As the management style, the UTCRIS is constructed in a layered structure shown in Fig. 1, so that unitary management in each faculty is enabled. Twenty-seven supervisors of each faculty report to the university administrator, and they have the authority of overseeing each faculty. In each faculty, laboratories manage their chemicals under the supervision of each supervisor.

UTCRIS includes the following features:

(1) Simple storing registration

UTCRIS contains more than 800,000 data entries related to chemicals including information on chemical containers, the name of chemicals, bar code tag number, product number, CAS no., volume, density and applicable rules or regulations. Therefore, the user can put the chemicals in storage after simply scanning the bar code tag number or the product number of the chemical container. Furthermore, when storing the chemicals, such information as inventory location, supplier and items unique to each laboratory can be added. Stored reagents are automatically assigned a unique number, and a bar code tag with the unique number is issued.

![Fig. 1. The layered-type management style of the UTCRIS.](image-url)
(2) Simple record of usage

The inventory information of the stored reagent can be easily shown by inputting the unique number of each reagent. The volume of inventories of the reagent is reloaded when the amount of chemical used is entered into the system. Using electronic balances, accurate weight management is also possible.

(3) Reference and summary in accordance with legislation

The chemical inventory and usage history can be displayed on the basis of registration of storage and usage of chemical agents. In addition, a reference and summary in accordance with legislation can be generated, and a variety of reports in various formats, including compliance reports to meet regulatory requirements and hazard communication requirements can be produced.

In addition, this system also enables the registration of high-pressure gas, and the management of high-pressure gas in conformity with the High Pressure Gas Control Law.

3. Management of Chemicals in Conformity with Legal Controls

In the University of Tokyo, the currently applied legislations include the OHS Law, Poisonous and Deleterious Substances Control Law, and Fire Defense Law and Pollutant Release Transfer Register (PRTR). Since, as noted above, the chemical information data in UTCRIS include rules or regulations applicable to the chemicals, the users can treat the chemicals exactly as outlined by the regulations. When, if necessary, users have to submit a report of the chemical inventory and usage to the university or city government, such a report in accordance with the legislation can easily be produced using this system.

In addition, in the University of Tokyo, chemical users must compile a summary of the inventory and usage of organic solvents and chemical substances specified in the OHS law, and must present this summary to the university administrator every three months. Table 1 shows an excerpt of the summary sheet required under the OHS Law. By means of this summary, users can reconsider their own current usage of chemicals. Also, the summary data are used for working environment measurements and health examinations. The summary sheet can easily be produced using UTCRIS.

In addition, since the inventory location and location of use are registered using the information supplied by facilities managed by the university system, the management in terms of individual rooms and buildings, faculties and also the university as a whole can be accurately assessed. In particular, in terms of the Fire Defense Law, management in relation to individual fire defense units is also available using the facilities data.

4. Future Plans

The main future plans for UTCRIS in terms of further development are as follows:

(1) Implementation of disposal process system

The process of the disposal of chemicals will also be implemented in UTCRIS, thereby managing the entire process from the purchase to the disposal of chemicals. The disposal process system of chemicals will conform to the guidelines of the University of Tokyo.
(2) Response to new legal control

Since regulations governing chemicals and high-pressure gases are expected to be strengthened even further in the future, a response to such regulations will be achieved by updating the database of chemical information.

However, even if an excellent management system is introduced, the management and control of chemicals depends on the user themselves. In the future, it is important not only to improve the system to further facilitate the management of chemicals, but also to change the consciousness of the chemical users regarding such management. Emphasis must be placed on environmental safety and health (ES&H) and the development of the University of Tokyo as a safe and secure research institute.

Table 1

Excerpt of summary sheet required by Occupational Health and Safety Law.

| Organic Solvent (from September to December, 2004) |
|---------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| (Occupational Health and Safety Law) |
| Affiliation (faculty, university) & Faculty of Engineering, the University of Tokyo |
| Place (campus, building) & 1st building in Hongo |
| Laboratory & Kankyo Laboratory |
| Chief administrator, appointment & Kankyo, Professor |
| Address (Tel, E-mail) & 03-5841-**** |

| 1st class Organic solvent (including mixtures more than 5 vol.%) & Amount in precheck (g) & Amount obtained (g) & Usage amount (g) & Disposal amount (g) & Present amount (g) & Usage frequency & Remarks |
|---|---|---|---|---|---|---|---|
| Chloroform & 200 & 1000 | 500 & 100 & 600 & 1a & 30% |
| Carbon tetrachloride & 500 & 100 | 200 & 0 & 400 & 2 & – |
| 1,2-Dichloroethane & – & – | – & – & – & – & – |
| 1,2-Dichloroethylene & – & – | – & – & – & – & – |
| 1,1,2,2-Tetrachloroethane & 500 & 200 | 300 & 100 & 300 & 1b & – |

| 2nd class organic solvent (including mixtures more than 5 vol.%) & Amount in precheck (g) & Amount obtained (g) & Usage amount (g) & Disposal amount (g) & Present amount (g) & Usage frequency & Remarks |
|---|---|---|---|---|---|---|---|
| Acetone & 1000 & 1000 | 1000 & 0 & 1000 & 1a & – |
| Isopropyl alcohol & 2000 & 1000 | 1000 & 0 & 2000 & 3 & – |
| Ethyl ether & 200 & 100 | 100 & 0 & 200 & 1c & 50% |
| Ethylene glycol monoethyl ether acetate & 1500 & 0 | 0 & 0 & 1500 & 3 & – |
Acknowledgement

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References

(2) Shimadzu System Development Co., Ltd.: <http://www.shimadzusd.co.jp>.