

# INFORMATION SHARING SYSTEM FOR PROCESS MANAGEMENT

Atsuto kura  
Hitachi Zosen Information Systems Corporation

jeff@fox.hzs.co.jp

Junichi Yagi  
Shimizu Corporation

Yoshiaki Kamura  
TOSTEM Corporation

**ABSTRACT:** In one construction production process, a huge quantity of data is used and it has complicated relation among companies and systems. But the system environment which associates it is not established by the present construction production. Therefore, when the event which blocks a process plan occurs, great cost occurs in change of a process plan. This paper shows how to realize the increase in efficiency of management by the information sharing system using XML technology and SVG technology. And, the "Parts and Packets unified architecture" system using RFID and Active Data Base shows the technique of preventing the increase in the cost accompanying change of a process plan.

**KEYWORDS:** Glue Logic, Parts and Packets, Active Data Base, RFID, XML, SVG

## 1. INTRODUCTION

It is almost the case for two or more companies to cooperate and to advance a process in the present construction production. And the amount of data used by one construction production process reached the huge number, and is entangled intricately among companies or in the company. However, although it is clear that these data has causal relationship, the system environment which connects it is not established by the present construction production.

And, in construction production, a detailed process plan is decided in advance, and, usually two or more companies concerned with the construction production and a section do work on the basis of a process plan. But, since various events which interfere with a process plan actually occur, the process plan decided first is changed in many cases. Since the event which blocks a process plan leads to the increase in direct cost, it needs to change a process plan so that damage may be suppressed to the minimum. But, since the amount of data used by the construction production process has huge and complicated relation, it is the present condition to have required the difficulties for change of a process plan.

## 2. THE OUTLINE OF A SYSTEM

By introducing a parts and packets unified architecture system and an information sharing system aims at reduction of the increase in efficiency of the management about redundant data, and the formation of cost increase accompanying change of a process plan to the problem of construction production.

The structure of "Parts and Packets unified architecture" is made into the precondition at introduction of a system. This embedded the minute radio tip called RFID to the Construction Department article, and has pointed out beam structure with a string for ID information to each Construction Department article. It is possible to read each ID information with un-contacting type reading equipment in this article. This reading equipment is installed in the important reference point of a construction production process, and the passage status is collected. Incidentally, in this research, the important reference point in this construction production process is called the "gate".

And, there is an Active Data Base (the following, It is referred to as ADB.) as an important base of a parts and packets unified architecture system. ADB carries out the optimal rescheduling, when the event which blocks a process plan occurs. And it has a function for reissuing directions required for the persons concerned. That is, ADB is an event drive type schedule optimization system using

the incoming signal from a gate.

In addition, ADB is based on the Glue Logic currently developed at the Tokyo Electric communication university and the Takata laboratory. The Glue Logic is a base system for control which makes it possible to perform processing autonomously to a specific input.

About the information sharing system, the Web application system using the database of XML form was adopted. Since XML has the feature which can absorb the difference in a data structure flexibly, it can absorb the difference in the data format over the company engaged in construction production, and the system.

And, the ubiquitous environment which can receive required information, without asking places, such as an office, a factory, and a construction site, is also offered by enabling perusal of the data of the construction production integrated by XML by the Internet. About the display screen, it is considering as the operation design which can pull out information by performing interactive operation on the drawing focusing on the drawing information for maintaining common recognition among construction production-relations persons. Operation which relates required information with a drawing image and can pull it out intuitively by this is realized.

### 3. DETAILS OF A PROTOTYPE SYSTEM

The following items were made into the requirements for a system in building the prototype of an information sharing system.

- (1) The database used by the system is made into XML form.
- (2) System form is made into a Web application system.
- (3) It is made the structure where a system is connectable with ADB.
- (4) The reference function to a database is mounted.
- (5) It is made the interface in which intuitive operation is possible.
- (6) The data format of drawing information is made into SVG form.

About (1), Use of XML is the optimal in order to unify the construction production data over the company and the system.

About (2), it is possible in the Internet to acquire information, without asking a place. Therefore, a system is made into a Web application system and it considers as the structure which can disclose information to the Internet.

About (3), By cooperating ADB and the information sharing system for optimizing a schedule, the increase in efficiency to a construction production process is raised in multiplication.

About (4), the construction production data accumulated by continuing employing a system serves as a huge quantity. Therefore, a reference function becomes indispensable.

About (5), the user of a system is not necessarily the expert of a computer. Therefore, an interface which can get information by carrying out interactive operation to the drawing information to display and which use tends to make intuitive shall be built.

About (6), in order to make a CAD drawing peruse by the Internet and to give interactive operation, SVG form is the best for the data format of drawing information.

In this research, the prototype of an information sharing system was created on the assumption that these requirements for a system. An information sharing system is accessed via the Internet and the screen with which arbitrary things were searched is shown in Figure 1. And the screen which displayed the detailed information on the searched thing is shown in Figure 2.

An information sharing system can be accessed by the browser through the Internet. And it is possible to search arbitrary things from a vast quantity of construction production data accumulated in XML form. The link to thing information is stretched to the reference result, and the information can be perused easily. It is possible for information to be related with the object of a drawing, to click an object, and to acquire detailed information interactively. And the structure which each object is made to display the newest process situation according to a color, grasps a process situation visually, and can start action because ADB cooperates is realized.

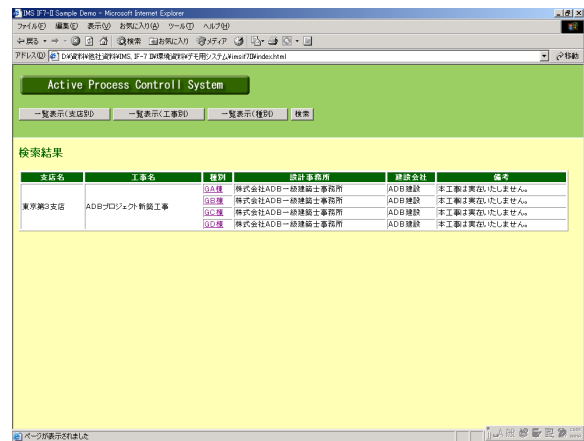


Figure 1 The display screen of a reference result

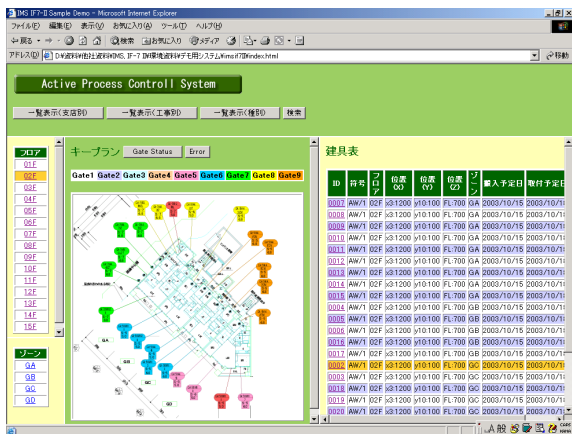


Figure 2 The detailed information screen of a reference thing

#### 4. CONCLUSION

By research of this fiscal year, the prototype of an information sharing system was operated, construction production data was unified in the database of XML form, and a possibility that information would be sharable among companies was shown. And by making it cooperate with ADB also showed a possibility that it might become the high interface of convenience over the rescheduling of a construction production process.

In the prototype system built this time, XML is made to collect construction production data and this structure is set as the center of a system. It is thought that it can respond flexibly when considering range extension of the systematization in construction production, since the system based on such XML is very excellent in extendibility.

The function to manage the layer structure of security strengthening of a system, and a drawing and attribute information is due to be added from now on. Furthermore, formal employment shall be put into a view and the load test and durable test to mass data of construction production shall also be considered.