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The Development of Equipment Specification Form from the PDXI Data Models

Justin M. Juengel

THE DEVELOPMENT OF EQUIPMENT SPECIFICATION FORM FROM THE PDXI DATA MODELS

J. M. Juengel
Department of Chemical Engineering
University of Missouri- Rolla

ABSTRACT

The project has culminated in the development of a simplistic working model, based upon the existing data model created by the Process Data Exchange Institute (PDXI). This data model is depicted in Volume 1 of the deliverables for the PDXI Data File Interchange Format Project. The working model, based in part on the Planning Level Model and the Heat Transfer Model [1] of the overall data model, was then used to create an equipment specification form (Fig 1) for a heat exchanger, partially utilizing the standards set forth by the Tubular Exchanger Manufacturers Association (TEMA).

INTRODUCTION

The development of the working data model and the equipment specification forms was accomplished for the Process Data Exchange Institute, a consortium of around thirty companies in the process industries. The ultimate goal of PDXI is to design and fabricate a large data interface amongst many different simulation and process design programs in the form of a database that allows data to be exchanged freely. The development of the equipment specification forms project entails the beginning of the fabrication of this database and an application of it.

A major problem that most companies in the process industries are faced with is the difficulty in manually maintaining equipment specification sheets during periods of frequent equipment replacement. The PDXI team at the University of Missouri- Rolla recently researched and developed a link from the AutoCAD design program to the Paradox database that will update information stored in the database about a piece of process equipment when it is changed in the AutoCAD program. Therefore, it became desirable to create a program that would produce an updated equipment specification sheet when a piece of process equipment is changed in AutoCAD.

PROJECT THEORY

The purpose of this project was to research and develop a method of creating equipment

specification forms from the existing data model created by PDXI. In theory, this can be accomplished by programming a working model into a relational database software program, such as Paradox, D-Base, or Oracle. These databases have the advanced object linking abilities essential for the immense size of the PDXI data model. Many of these databases also have form-generation capabilities that allow the user to program the format of the output and automatically extract the necessary data for this output from the database.

PROJECT RESULTS

The database Paradox for Windows (version 4.0), produced by Borland International, Inc., was utilized to program the working data model. It was chosen for its data modeling abilities, its vast form- generating capabilities, and its inexpensive price. Once the working model was developed on Paradox, research began into the formation of the heat exchanger specification sheet. It was discovered by examining the software user's guide [2] that a form could be generated from a query with a separate data model. Using the TEMA heat exchanger specification sheet found on page 690 of *Chemical Process Equipment* [3] as a guide, the sample specification sheet was constructed (Fig. 1).

The sample form illustrates a specification sheet for a standard shell and tube heat exchanger. The program performs a query on all the flow specifications and critical information in the database for this heat exchanger. The methods developed for the production of this specification sheet can be utilized to create any other desired document.

CONCLUSION

The ramifications of this project on future research are great. The heat exchanger specification sheet is but one application of the working data model that was created in this project. Additional equipment specification forms can be generated for any pieces of equipment located in any given process plant. These can be customized to meet any company's specific guidelines with relative ease.

Also currently under development by the UMR PDXI team is a program that will automatically produce a bill of materials for any piece of process equipment in the database that is to be replaced. This, in conjunction with the aforementioned AutoCAD- Paradox link, is an extremely valuable industrial inventory management tool. Also being examined for future research are additional links from software packages commonly used by industry to the data model. With the creation of additional links, the possibilities for applications of this working data model are limitless.

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Meister Co.

Louisville KY

Heat Exchanger Specification Sheet

Performance of One Unit

	Shell Side	Tube Side
Fluid Circulated	Benzene	Water
Temperature In	75.00 F	250.00 F
Temperature Out	135.00 F	215.00 F
Operating Pressure	100.00 PSI	450.00 PSI
Number of Passes / Shell :	1	2
Velocity :	10.00 ft/s	35.00 ft/s
Pressure Drop	35.00 PSI	15.00 PSI
Fouling Resistance :	0.01 s3/ft lb F	0.00 s3/ft lb F

Construction

Tubes No. 25 OD 0.12 ft Length 20.00 ft

Shell ID 10.00 ft OD 10.50 ft

Heat Exchanged : 100.00 BTU/hr

Figure 1- Sample Heat Exchanger Specification Sheet

REFERENCES

1. Process Data Exchange Institute, The PDXI Data Models, Phase I Final Draft, © 1993 American Institute of Chemical Engineers, New York.

2. Borland Int'l, Inc., Paradox for Windows- User's Guide, Version 4.0, ©1992 Borland International, Inc., Scotts Valley, CA.

3. Walas, Stanley M., Chemical Process Equipment, ©1988 Butterworth Publishers, Stoneham, MA.