

Research on Optimized Equipment System with Computer Aid for Water Purification

Ge Changqing^{*1} Wu Junmin²

(¹ Basic Courses, Suzhou Institute of Urban Construction and Environmental Protection, Suzhou 215011, China)

(² Purification Technology Research Center, Jiangsu Sujing Group Ltd Co., Suzhou 215008, China)

Abstract: This paper describes pure-water making equipment by using applicable database, computer languages and drawing software. It gives a general introduction to the systematic designing plan, the division of the different parts and their functions, and the pure-water making technological process.

Key words: technological process, flow chart, water quality, pure-water, super-pure water

With the appearance and development of pure water and super-pure water, a large variety of water-processing system enters the present market of pure water and super-pure water making facilities. Different facilities are needed to process water of different qualities and produce water of different standards. Here comes the necessary and practical project to set a designing system according to the different requirements to water resource quality, product water quality and water output and the material quality and precision of water processing facilities, which is able to optimize, quote and draft for the water processing facilities and technological process. A lot of research has been done on water quality and water processing facilities to develop this system.

1 Function of System

The traditional methods in researching the system are: to select a proper set of water processing facilities following the water quality report and product water requirements provided by the clients under certain specification, draft the technological process for the facilities, and work out the detailed list and quotation for the facilities, accessories and material. These usually take several people weeks of time, which is too long for the distant clients. Consequently the deal closing rate is ill-affected. In the past few years, the rapid development in computer science and technology has brought great changes to various fields by enabling people to complete the work, used to be done by hands, with the help of computers. In this way the scheme that can both satisfy the clients and has the lowest price can be easily presented, technological

process drawings drafted instantly, detailed list of facilities, quotation and drawings printed. The clients can get the information needed right away, which enables both parties to reach an agreement very soon. As a result, it not only is economical for clients, but also improves the efficiency and quality greatly.

2 Researching Scheme of System

It is necessary to understand both selection procedures of water processing facilities by hands and by computer before studying the system.

2.1 Selection and quotation procedures of water processing facilities by hands

- 1) Study the original data;
- 2) Apply certain specifications following the original data, and figure the facilities required and the quotation;

- 3) Draft the technological process drawings.

Optimization, quotation and technological process making procedures of water processing.

2.2 Facilities by computer

In this system, the computer completes the foregoing three functions, embodying its advantages of data processing by database and drawing drafting by drawing softwares (such as Auto CAD)^[1,2].

- 1) Optimization of technological process

In accordance with the original data provided by the clients and their different requirements to the product water quality and material quality of water processing facilities, the system is able to inquire, calculate and select the related database automatically,

and list multiple system schemes for water processing facilities following different requirements to the particular standard. These schemes are described in the form of technological process drawings that are distinct for the clients to choose from.

2) Quotation analysis

In the above mentioned schemes, only the composition of the facilities and the sequence of the technological process are showed. In accordance with the clients, different requirements to the consuming amount and the material quality of the facilities, the system is able to inquire, calculate, choose automatically, and accordingly determine the various types, specifications, prices and sizes of the systems. As a result, the total price can be figured, and the quotation

list as well as the technological process drawings can be printed for the clients to make further decisions.

3 Division of System Module

The system is designed in module structure to use, modify and expand the system, to simplify the program design, operate simultaneously and develop the feature of sustainable expanding.

3.1 Primary control module and its first level sub-modules

The system consists of a primary control module and 6 first-level sub-modules that are controlled by and co-ordinated with the primary control module. See Fig.1.

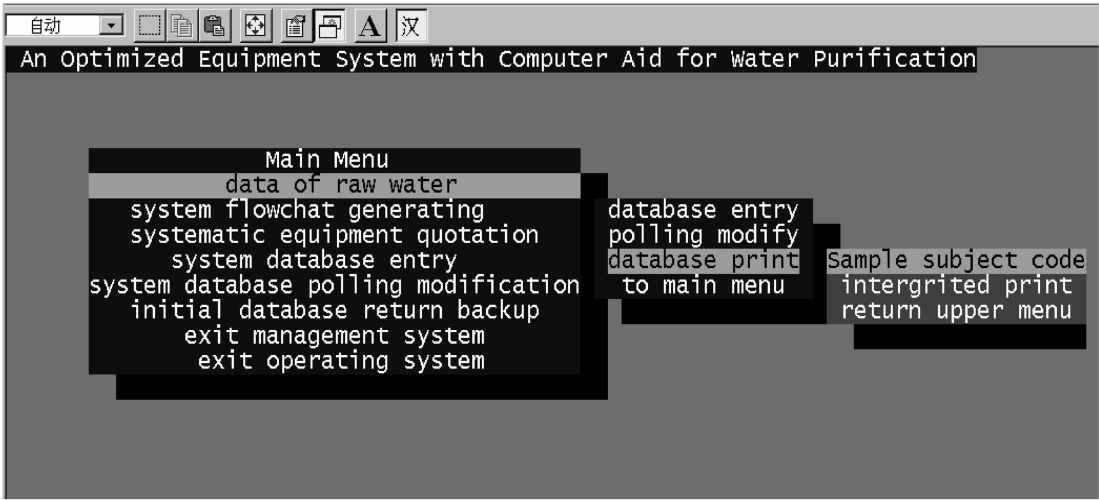


Fig.1 Primary control module and sub-modules

3.2 Second-level and third-level sub-modules

Each of the above mentioned first-level sub-modules can be divided into several second-level sub-modules to the different functions. Some can be divided further into third-level sub-modules. See Fig.1.

4 Establishment and Quotation for Technological Process

Following the water quality report, requirements to the purity of product water, water output, daily work time and requirements to the material quality of facilities taking costs into consideration, which are provided by the clients, the system is able to present the schemes for water-processing technological process and equipments (facilities system), and quotations for the clients to choose from^[3]. See Fig.2.

5 Conclusion

During the system researching, relational model of database, senior language and drawing software are used as the developing environment. A structural program function module which is expandable and revisable is made through proper database structure and calculating method in the system design. A large amount of structure drawings for individual equipment are drafted using the drawing softwares to compose a sub-drawing storage. According to the client's water quality report and the requirements to the product water, the system is able to choose modules of various functions automatically, draft the technological process drawing, and quote for the unit price for the individual facility and the total price. Following the client's different requirements to the material quality and different water resources, the system is able to provide multiple technological processes and quotations from

which the client can choose a suitable one.

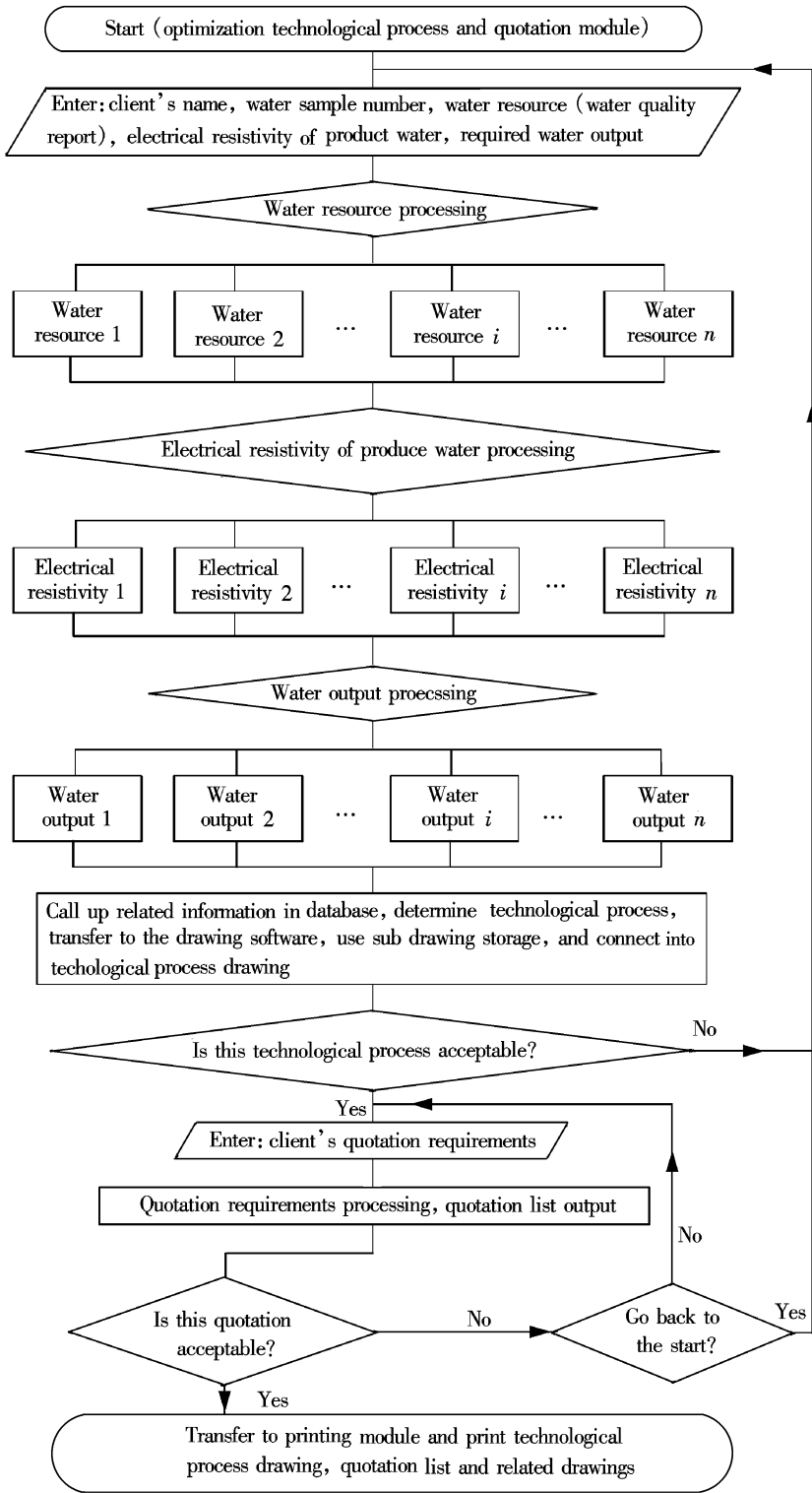


Fig.2 Establishment for technological process

Following the technological process draft drawing the program can choose various sub-drawings using the drawing software automatically, and connect them into a complete technological process drawing. The client thus can choose a both practical and economical scheme through the visual representations and

subsequently sign an agreement with the supplier. This system has been put into use and proved effective and profitable.

The most distinctive feature of this system is its practicability. Many programs in system developing are designed from the initial stage, as a result, they

operate very steadily. The system is so easy to operate that it can be mastered or even modified later by the staff who are not so familiar with the computer. The system is really popular with the plants for the foregoing advantages.

Another feature of this system is that it is revisable, expandable and transplantable. During the system researching the advantages of calculating language, database and drawing software are converged into a practical software that is applicable in manufacture. Due to its module structure, the system can be easily modified, added, cut and expanded. With a little modification, it can be transformed into a software system for other functions.

The current technological process drawing is a two-dimension drawing showing the water-processing

technology and facility system, which is supposed to be rendered by some drawing-processing software so that it is more visualized for clients when they are choosing water-processing facilities.

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计算机辅助制取纯水装备的研究

葛常清

吴俊民

(苏州城建环保学院基础部, 苏州 215011) (江苏苏净集团洁净技术研究中心, 苏州 215008)

摘 要 综合应用数据库、高级语言和绘图软件研制制取纯水装备自动设计系统.概括介绍了系统研制方案、各模块的划分与功能及制取纯水工艺流程的制定.

关键词 工艺流程,流程图,水质,纯水,超纯水

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