

Research on Steel Pipe Tracing System

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For domestic steel companies management lags behind, in the face of increasingly fierce competition in international and domestic markets, the implementation of an effective system of steel queries is necessary and urgent. In order for consumers can check the relevant steel pipe manufacturing information after the purchase, a pipe tracing system is researched and developed in this paper. The system uses the B / S structure, uses ASP to develop prospects interface and uses SQL SERVER 2008 database as a background. Achieve function that steel information can be added and queried, cycles and station information can be queried and added and so on, which supervise and manage the steel pipe from the source. Finally, the system implementation renderings are shown.

1. Introduction

Internet technology has been very mature today, which was confirmed by Cheng Wang et al., [Li Yang-jun et al., Qiuhe Huang et al., Sucheng Shang.. Using the Internet to develop traceability systems becomes into a hotspot, which was confirmed by M. Krotkiewski et al., A. R. et al., Hobbs J E et al., Pettitt R G, Mauro Conter et al., Jevsenik M et al.. As important steel, steel pipe maintains a rapid growth rate in the domestic consumption. Export volume is increasing year by year, which was confirmed by China Steel Harbor, LIU Tao et al. There is a large difference on quality of steel pipe which produced by us and imports. It is because of differences in quality that gives us a huge economic loss, which was confirmed by Gui Ying and Wang Jing-gang. To change this situation, domestic enterprises are standardized managed, constantly improve the quality of steel and establish a sound quality assurance system, which are problems that the enterprise had to face. Therefore, traceability system of steel pipe is developed, from the source to supervise and manage the quality of the steel pipe, improve the quality of steel pipe.

2. Systems Analysis

Currently, the network application in all walks of life has gained popularity. This allows business managers to understand operating condition of the business anytime, anywhere, to solve the problem more effective. Query progress according to user's input, user-friendly for user intuitive understanding of the progress of the pipeline. Use function modular design method, both for system functions in various combinations and modifications, and easy supplement and maintenance by staff not involved in developing. The maintain core process planning of system is shown in Figure 1.

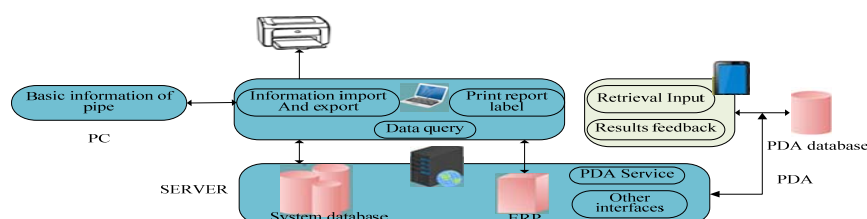


Figure 1. Process planning of system

Pipe traceability system developed in this paper mainly uses in B / S structure, which was confirmed by Chen Changxi, et al, uses asp.net, which was confirmed by Adam Freeman and Aguilar, and three-tier(presentation layer, business logic layer, data access layer) mechanism to develop. The three-tier model is shown in Figure 2.

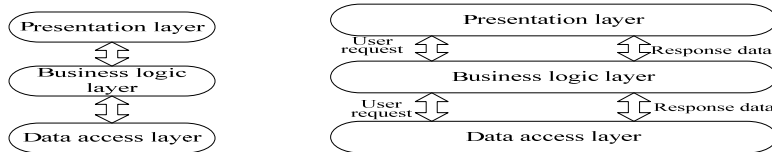


Figure 2 Three-tier structure Figure 3 Data transfer between three-tire

The presentation layer provides users with an interactive user interface, business logic layer handles business-critical, responsible for data transfer between presentation layer and data access layer, data access layer achieve the data stored and read operations, which is shown in Figure 3.

3. System Design

3.1 System Components

1) The system includes four functional modules, namely materials information management, user management, cycle management and station management. Material information management module includes material information storage and material information query, which is shown in Figure 4.

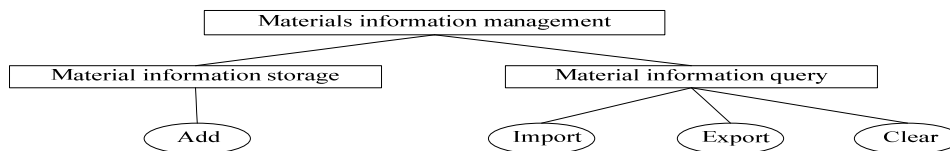


Figure 4. Material information management module

Material Information storage: mainly for the need for traceability of the product to add into the system to facilitate every record there will need to input the information corresponding part number, tube number, weight, width, length, heat number, lot number information .

Material Information query: mainly for adding product pipeline management, including import, export functions, user-friendly operation. Import is given according to the user based on excel template and edit the information you want to import, and then imported in bulk, when there is information to excel in the same time will not repeat the import. All information derived materials, to facilitate the user to view, edit and manage. Clear role is to clear all the information (with caution).

2) User management module major includes new users and user queries two functions, which is shown in Figure 5.



Figure 5. User management

Figure 6. Cycle management

New user: users contain an administrator user. Users who added to the system can not log on, only add to the traceability of products flow. When add the user, must choose detect bit belongs to, which in order to easily detect which bit is operated. Adding needs to include the new user name, password, and the station is detected.

User query: for users to edit and delete functions. Edit mainly on the existing users to update the information. Delete mainly for existing users select Delete.

3) Cycle management module includes adding cycle, cycle query, which is shown in Figure 6.

Add cycle mainly display evening and early morning period of time to convenient record the operation shift of product recording. Information needs to be added are name, start time and end time. Edit mainly on existing information updated. Delete can choose information to delete.

4) Stations management module mainly includes process query, add stations, station query process queries, which is shown in Figure 7.

Process Query: query by keyword, classes, day, week and month. Export all data inside the pipeline, including all other information pipeline to export all parameters. Clear all information. Station Add: Add station information, the station name, the process sequence need to be input. Station query: displays all information of stations, the selected stations can be updated, delete the existing station information

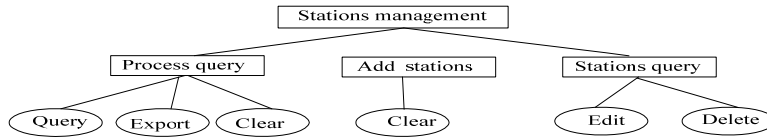


Figure 7. Stations management

3.2 System flow chart

The flow chart of system is shown in Figure 8.

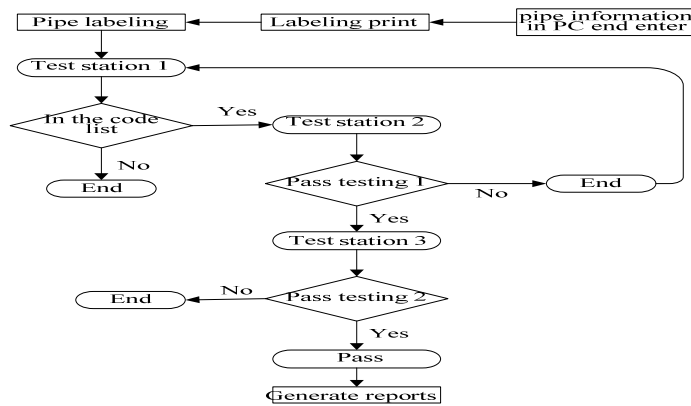


Figure 8. The flow chart of system

3.3 Database Design

This database tables are mainly used in the system as follow.

Table1 Code single table

No.	Column name	Data types	length	Decimal	Primary key	Explanation
1	ID	int	4	0	Yes	
2	Partnumber	int	4	0		Part No.
3	Tubingnumber	nvarchar	550	0		Pipe No.
4	Weight	nvarchar	50	0		Weight
5	Length	nvarchar	50	0		Length
6	Heatnumber	nvarchar	50	0		Furnace No.
7	Batchnumber	nvarchar	50	0		
8	CreatTime	datetime	8	3		
9	CreateUser	nvarchar	50	0		
10	EditTime	datetime	8	3		
11	EditUser	varchar	50	0		

Table2 Cycle table

No.	Column name	Data types	length	Decimal	Primary key	Explanation
1	Id	int	4	0	Yes	
2	Period	nvarchar	50	0		Cycle name
3	StartTime	datetime	8	3		Starting time
4	EndTime	datetime	8	3		End time
5	AddUser	int	4	0		Add user
6	AddTime	datetime	8	3		Add time
7	Z	nchar	10	0		Reserved
8	ParentId	int	4	0		Check

Table 3 Detect bit table

No.	Column name	Data types	length	Decimal	Primary key	Explanation
1	ID	int	4	0	Yes	
2	Name	nvarchar	50	0		
3	ParentID	int	4	0		
4	z	nchar	10	0		Reserved
5	ParentID	int	4	0		

Table 4 Operating Table

No.	Column name	Data types	length	Decimal	Primary key	Explanation
1	ID	int	4	0	Yes	Pipe No.
2	Num	nvarchar	50	0		
3	ActionTime	datetime	8	3		
4	ActionName	nvarchar	50	0		Reserved
5	PeriodID	int	4	0		
6	UserID	int	4	0		
7	StationID	int	4	0		

Table 5 user table

No.	Column name	Data types	length	Decimal	Primary key	Explanation
1	ID	int	4	0	Yes	
2	UserName	nvarchar	50	0		
3	UserPwd	nvarchar	50	0		
4	Flag	int	4	0		
5	PeriodID	int	4	0		

4. System implementation

Users first enter the system login screen is shown in Figure 9.

Figure 9. Login screen

Then enter information query interface to query the information, which is shown in Figure 10.

Select all	Part number	Pipe No	Weight	Length	Furnace No	Lot number	Operate
<input type="checkbox"/>	147	147	147	147	147	147	Edit Delete
<input type="checkbox"/>	12	72-145824-01	11	11	11	11	Edit Delete
<input type="checkbox"/>	747	747	747	747	747	747	Edit Delete
<input type="checkbox"/>	11	11	11	11	11	11	Edit Delete
<input type="checkbox"/>	10	6922233623846	30.5	40	50	60	Edit Delete
<input type="checkbox"/>	2	32	32	32	321	321	Edit Delete
<input type="checkbox"/>	2132	32	32	32	321	321	Edit Delete

Figure 10. Material information inquiry

If you enter an administrator, you can also add material information, which is shown in figure 11.

User name	Classes	Station Detect
5	测试工位	Edit Delete
4	工位检测4	Edit Delete
3	工位检测3	Edit Delete
1	工位检测1	Edit Delete
2	工位检测-2222	Edit Delete
admin	工位检测1	Edit Delete

Figure 11 Add interface material

The system can also manage users, user management interface shown in Figure 12.

User name	Classes	Station Detect
5	Test stations	Edit Delete
4	stations test 4	Edit Delete
3	stations test 3	Edit Delete
1	stations test 1	Edit Delete
2	stations test 2	Edit Delete
admin	stations test 1	Edit Delete

Figure 12. User management

The cycle management interface shown in Figure 13.

Name	Starting time	End Time	Operate
Morning shift	2015-3-17 18:58	2015-1-26 20:54	Edit Delete
Night shift	2015-1-27 08:50	2015-3-17 18:58	Edit Delete

[Home](#) [Back](#) [Next](#) [End](#)

Figure 13. Cycle management

5. Conclusion

At present, the lack of effective tracking of steel production situation in our country makes the steel pipe companies with low competitiveness. Pipe traceability system developed in this paper solves the problem of supervision of quality steel from the source, to ensure the effective competitiveness of enterprises. The system uses B / S structure to develop. Users can query production information after purchase steel and other information of steel cycle through the system. Therefore, the system developed in this paper has certain significance in traceability of steel work.

Acknowledgements

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