

International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Visit: www.ijirset.com

Vol. 7, Issue 6, June 2018

A Study on Usage of Management Information Systems in Occupational Safety

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ABSTRACT: As partners of occupational safety, employer, employer's representative, occupational safety specialist, employees and even the workplace visitors can be counted. But because employer and occupational safety specialist have been accepted as responsible, systems are designed for these two partners. But occupational safety files must be always accessible to employees who are key affected partner and even temporary visitors. A research on usage of management information system in occupational safety was made and as a result of this research, it was seen that there is a need for a system to facilitate access and follow-up of occupational safety files, especially for all partners affected by occupational safety. For this purpose, we have focused on information access methods for storing and accessing files in computer environment for controlling and tracking documentation in occupational health and safety. Near Field Communication and QR code (data matrix) labeling are used as access methods. A modelling for the implementation of the system for file document entry was made. As a result, outputs such as this application may create open, easily accessible, transparent, understandable and sustainable knowledge banks for all partners in occupational health and safety services, facilitate internal and external audit processes and all partners become an honorary auditor have been obtained.

KEYWORDS: Management Information System, Occupational Health&Safety, Software.

I. INTRODUCTION

Today, with the rapid growth of the industry, occupational diseases and work accidents have become the most serious health problems of employees. Every year tens of thousands of people lose their lives or injured with losing body part because of work accidents. Besides that, serious labor force and economic losses are also experienced.

In order to avoid these losses, it is very important to ensure that work safety measures are met and their continuity are maintained. Occupational safety is not just the responsibility of certain people, it is a culture that interests the whole company. As of work safety can be counted as the employer, the work safety expert, the employee, the state, or even the temporary workplace. As the stakeholders of occupational safety, employer, occupational safety specialist, employee, government or even the temporary visitors can be counted. In occupational health and safety system, there are routines that need to be done. These routines must be carry out with using technology and proper control and audit. For this reason, it is important that the data is processed fast and information is easily accessible. In this respect, rapid access to information and documentation and information systems that facilitate this are important. It is also important to have access to these information and documentation by all stakeholders. Once this has been achieved, all stakeholders have become an honorary auditor and business security will become a culture that spans the entire organization.

In this research, as a new approach on usage of information systems in occupational health and safety, in order to demonstrate the applicability of information access technologies such as near field communication and qr code to field studies about critical information such as periodic control follow-up process. Moreover, for a workplace occupational health and safety files are categorized as company, building, employee and equipment files and are accessible from all platforms and to all stakeholders.

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II. PERIODIC CONTROL OF WORK EQUIPMENT AND FOLLOW-UP

There are static and dynamic sources of hazards in occupational safety. One of the dynamic ones is the moving, working equipment that does work. Because they are dynamic, they cause fatal accidents. Therefore, periodic control and maintenance of work equipment and follow-up are necessary. When you think of a workplace, examples such as not activated fire detection and extinguishing systems during a fire, hot water boiler explosion with display failure can be given. In this respect, periodic controls are an important part of occupational security.

III. OCCUPATIONAL HEALTH AND SAFETY DOCUMENT INVENTORY

When a public university is considered, it is necessary for an officer to be able to learn about the periodical control and maintenance of the pressure vessel or boiler used in the laboratory at the basement floor by accessing the relevant documentation. It is the natural right for this officer to access the periodic controls of the electrical installation, lightning rod systems of the building he or she works at. Employees must be able to access all relevant documents, reports as they are mainly affected in occupational safety.

In the following figure, it is shown that a grouping of what needs to be accessed and who needs access.

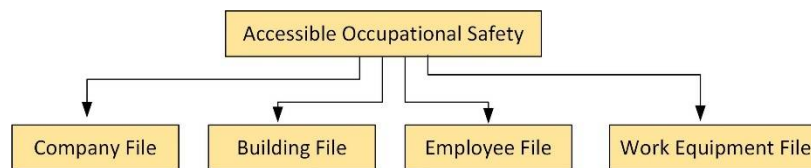


Figure 1. Accessible OS system file groups.

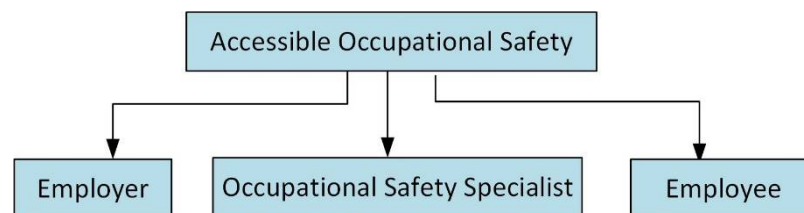


Figure 2. Accessible OS system user groups.

There are operations that need to be done at each stage of work safety. In addition, in order to control these operations the work done should be archived and documented on a regular basis.

In this study, document entry and access by using a NFC and qr code labeling application to control and follow up company, building, employee and work equipment files folder was implemented. As field application, a public university was selected.

A website was created specifically for this project. A web site with www.erisilebilirisg.com domain name in Turkish was created by using asp script code. Firstly, static documents for company, building, employee and work equipment files folder were transferred to the computer environment and uploaded to the site. Besides, dynamic documents by using document entry tag were archived.

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COMPANY FILE	WORK EQUIPMENT FILE
Occupational safety board decisions Training Presentations Education content Training signature list Risk analysis and management Emergency phone list Emergency team list Emergency collection areas Emergency plans, scenarios Emergency practice reports Event, near miss and accident reports Instructions Procedures Inspection reports Monitoring and measurement plan Equipment list	Operation and maintenance manual Warranty certificate Installation scheme Safety equipment Usage and safety instructions Machine daily, weekly, monthly control form Periodic control form Maintenance and repair book Certificate of calibration Work equipment risk assessment
EMPLOYEE FILE	BUILDING FILE
Health report Technical qualification certificate Training Personal protective equipment	Risk assessment Building emergency team list Emergency phone list Building emergency collection Areas Emergency plans, scenarios and practice reports Building event, near miss and Accident records Instructions Procedures Inspection reports Equipment list

Figure 3. Accessible OS system files.

The daily, monthly control form containing the information of the company is uploaded to site for boiler installed in 2013. Documents produced and submitted in the field were automatically made by photographing with a mobile device at the equipment. It is possible to access the top and bottom category information with category link except for the documents uploaded on the site. In other words, it can be accessible the list of other equipment belonging to that building or the information of the building or the information of the institution when it accesses the documents of the equipment which is also located in a building.

IV. CASE STUDY

After the files are created, it is possible to view and download the document by clicking on the relevant document picture on the web page which is connected to the link on the label. It is possible to do this from both the mobile device and the desktop computer. Update of these documents can be monitored and checked from work field. With the link

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provided in the NFC label placed on the boiler in the field, it is ensured that all the employees and those concerned are always up to date.



www.erisilebilirisg.com/ekipman/kazan/001

Figure 3. NFC and QR code access tags for the boiler equipment file.



www.erisilebilirisg.com/belgegiris.asp?ekipman=kazan&id=001

Figure 4. NFC and QR code document entry tags for the boiler equipment file.

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Figure 5. Picture of tags applied on the boiler.

Three different methods of accessing the file with link in tags are provided. It is possible to access file with written link text and NFC, QR code tags. Since it is not easy to entering text in the field, QR code tag is used as a secondary access method. But for this an extra QR code reader program is required. With the NFC tag, which is the main access method, approaching NFC compatible mobile phone to the tag is just sufficient. In this way it is possible to easily access the equipment file and check at the field.

Other file access tags besides the equipment file access are also given below.



www.erisilebilirisg.com/calisan/ahmetsakin/

Figure 6. NFC and QR code access tags for an employee (Ahmet Sakin) file.

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Figure 7. NFC and QR code access tags for the company (Kurum) file.

Apart from these, following tags was created to access a building file:



Figure 8. NFC and QR code access tags for the building (AB1) file.

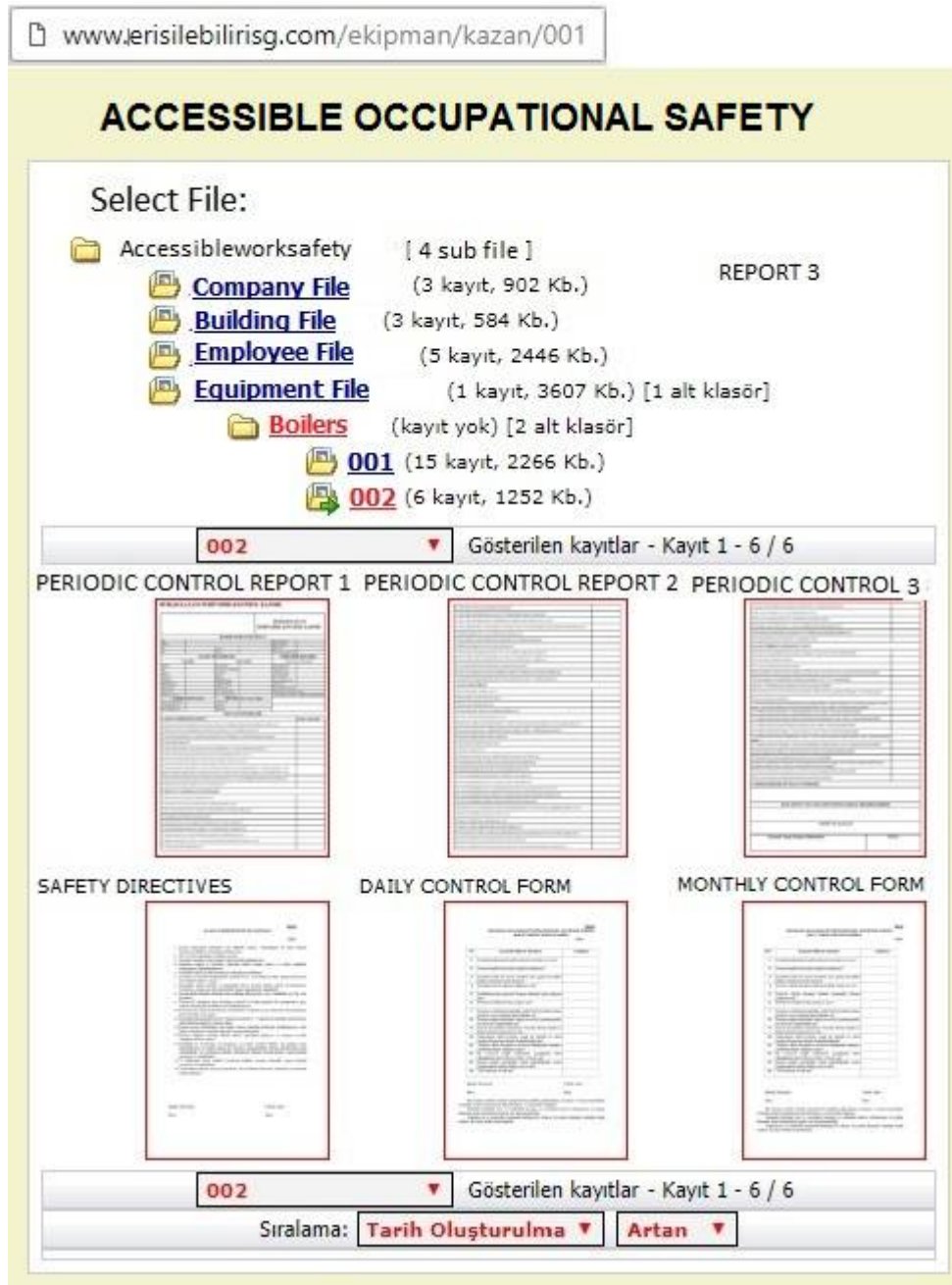
When you consider institutions that have many machines and equipments such as a public university. many documents have to be dealt with. These documents are only kept in the occupational safety unit. This document and information may always be required to be accessed by internal and external auditors, and even by employees of the entire organization. Especially employees, because employees are mainly affected by occupational safety. With the NFC and QR code tagging system, a highly functional and easily accessible solution is provided. In occupational health and safety. using management information systems in work environment, safety audits and controls become easier.

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www.irisilebilirisg.com/ekipman/kazan/001

ACCESSIBLE OCCUPATIONAL SAFETY

Select File:

- Accessibleworksafety [4 sub file]
 - Company File (3 kayıt, 902 Kb.) REPORT 3
 - Building File (3 kayıt, 584 Kb.)
 - Employee File (5 kayıt, 2446 Kb.)
 - Equipment File (1 kayıt, 3607 Kb.) [1 alt klasör]
 - Boilers (kayıt yok) [2 alt klasör]
 - 001 (15 kayıt, 2266 Kb.)
 - 002 (6 kayıt, 1252 Kb.)

002 Gösterilen kayıtlar - Kayıt 1 - 6 / 6

PERIODIC CONTROL REPORT 1 PERIODIC CONTROL REPORT 2 PERIODIC CONTROL 3

SAFETY DIRECTIVES DAILY CONTROL FORM MONTHLY CONTROL FORM

002 Gösterilen kayıtlar - Kayıt 1 - 6 / 6

Sıralama: Tarih Oluşturulma Artan

Figure 9. Accessing file page screenshot of erisilebilirisg.com web site for the equipment (Kazan-001)

A document entry page has been created for the entry of some variable and site generated documents such as periodical control reports in the field quickly. In this way, current information from the scene is quickly entered into the system, making recording easier.

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ACCESSIBLE OHS BOILER 001

Note:

Date: 03.06.2018

Picture: No file chosen

Figure 10. Document entry page screenshot of erisilebilirisg.com web site for the equipment (Kazan-001)

V. CONCLUSION

As a result of research on the usage of management information systems in occupational health and safety, it has been seen that information systems are only accessible to certain stakeholders such as employer and occupational safety specialist. Especially the employees, who are mainly affected, have a lack of information system that they can access at any time and from any platform. For this, a health and safety management accessible information system to all stakeholders has been designed and implemented that facilitates access to it. In this study, NFC, QR code and tag systems have been tried in a university. NFC, QR code tag systems that will facilitate the problem of continuous monitoring and control especially for occupational health and safety by providing information that can be easily accessed at any time. Therefore, these systems should be used in hazardous work environments for increasing occupational safety standards.

REFERENCES

- [1] Elçi A., A proposal for the safety monitoring system equipment industry: Data matrix barcode application, Master Thesis, Yeni Yüzyıl University, Istanbul, 2014, (in Turkish).
- [2] Morak J, Schwetz V, Hayn D, Fruhwald F, Schreier G. Electronic Data Capture Platform for Clinical Research Based on Mobile Phones and Near Field Communication Technology. Kanada; 2008.
- [3] Prinzn A, Menschner P, Leimeister M.J, Electronic Data Capture in Healthcare— NFC as Easy Way for Self-Reported Health Status Information. Health Policy and Technology, 2012.
- [4] Eryüksel M., Use of wireless communication tools in health and safety " karekod ve nfc ", Master Thesis, Yeni Yüzyıl University, Istanbul, 2017, (in Turkish).
- [5] Taşkın Çelik A., 2D bar code based document management system used in medium-sized municipalities. Master Thesis, Trakya University, 2012.
- [6] Bilgehan E., The importance of using a chip card for supervision of occupational health and safety trainings. Master Thesis, Gedik University, 2016, (in Turkish).
- [7] Narol T., The NFC technology implementation on public transportation in smart cities. Master Thesis,. İstanbul: Yıldız Teknik University; 2014, (in Turkish).