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QR CODE FOR PORTABLE FIRE EXTINGUISHER WITH MONITORING OF ONLINE APPLICATION IN INDUSTRY

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ABSTRACT

Fire Extinguisher is used to extinguish or control the fire during in case of any emergency. It is inspected monthly basis. Check that the extinguisher of pressure condition is normal, make sure that the nozzle is obstructed or any damaged. Once inspection is completed to record a data in attached aluminium tag and inspection checklist. This QR-based monitoring system can reduce officer errors in recording data about the fire extinguisher check's outcomes, finding data about the check's outcomes, and being able to view and readily available. Every fire extinguisher has a QR attached to it that contains information about its current condition, such as type of extinguisher, pressure condition, powder condition, expiry date, and next service month. If the service month is over it is automatically trigger on online application. Fire Extinguisher following standards: **IS2190, IS 15683** and **NFPA 10**.

KEYWORDS: Fire extinguisher, QR code, Traceability and Validation.

1.INTRODUCTION

In a business, fire extinguishers are essential tools for preventing fires and fighting them when they do occur. When it comes to the industrial application of fire extinguisher management. The purpose of the inspection is to make sure the fire extinguisher is under pressure and that there is no leakage that would render it useless. The security team also shakes the fire extinguisher tube once a week to keep the contents from settling and to make sure the extinguisher is ready to use in the event of a fire. Installing fire extinguishers is an initial step on fire suppression before the fire becomes large. Light fire extinguishers (APAR) are required standard equipment for building security. Because of its limited capacity, this fire extinguisher is designed to control fires that have just started or whose fire size is limited. A fire extinguisher is a tool that is used to put out or manage small flames. High-pressure fire extinguishers are typically housed in tubular form inside Light Fire Extinguishers. Since a fire extinguisher is a pressure device, it needs to be maintained to ensure that fire in case of a fire, extinguisher equipment will operate as intended. This fire extinguisher inspection's goal is to confirm that everything about it complies with standard [4]. It is not intended for use with uncontrolled fires to use this fire extinguisher. The fire extinguishing ingredient of this extinguisher is contained in a high-pressure tube. The process of inspecting fire extinguishers can now be facilitated by digital techniques such as barcodes and Android applications, thanks to advancements in equipment inspection technology. The development of technology has made everything pertaining to human activity possible. That were previously completed by hand can be completed more quickly and easily by employing recent technological advancements. The necessity for mobile phones has grown significantly in the process of locating information or searching data due to the current rapid growth of mobile phone technology. A structured system can expedite and facilitate human labor, which is still primarily done by hand.

2. LITERATURE REVIEW6

The fire emergency response system includes the provision of fire extinguishers, which is crucial to preventing fire-related emergencies. It is not necessary to wait for a fire emergency to apply an emergency response system, in this case installing fire extinguishers. But preparations must be done in advance to foresee fires, reduce damage, and avoid casualties [7]. It is crucial that both closed and open spaces have fire extinguishers available, especially in areas where fires could break out or are likely to occur. Previously, equipment maintenance records had to be written down by hand. However, the Mei-V application has changed this by enabling Android applications to record tool maintenance through QR-Code scanning. The application for Mei-V was developed with the intention of offering a way for apps linked to the live database to record tool maintenance. The Spiral Model approach is used by the program to enable ongoing development, which includes the addition of new features and adjustments made in response to user requirements. The flexibility of application development is the tangible outcome of using the Spiral Model since it can always be observed and fixed at any time.

The Mei-V program can offer a variety of helpful data for maintenance tasks, such as comprehensive equipment maintenance data and supervisor-downloadable maintenance reports. To comply with government rules, a large number of fire extinguishers are required (PERMENAKER). Because there are so many fire extinguishers on the market today, data management and fire extinguisher inspection require the assistance of a system or application of the outcomes of the Android-based APAR check. In order for the procedure to be completed more quickly and accurately and to obtain fire extinguisher information that is about to expire or APAR that needs to be updated with fresh contents (refill APAR). This system was developed using the PHP programming language and waterfall approaches. The result of the development of this application is an apar checking application / system that is useful for minimizing officer errors in writing, finding data on the results of checking fire extinguishers quickly and precisely, and providing information to officers about fire extinguishers that will expire / need to be refilled. The application can be accessed anywhere and anytime via android / smartphone.

3. DEFINITION OF FIRE

3.1 SPREAD & STAGES OF FIRE

The spread of fire can occur through various means, including:

Convection: Heat rises, carrying embers and sparks to other areas.
Radiation: Heat waves travel through the air, igniting nearby combustibles.
Conduction: Heat transfers through solid objects, igniting adjacent materials.
Embers: Glowing particles can travel through the air or on surfaces, igniting new fires.
Firebrand: Burning objects, like branches or debris, can be carried by wind or water to start new fires.
Human activity: Carelessness, arson, or accidental ignition can spread fire.
Wind: Strong winds can fan the flames, spreading embers and sparks to new areas.
Topography: Fire can spread quickly uphill or through canyons and valleys.
Fuel: Continuous fuel sources, like vegetation or combustible materials, can allow fire to spread.
Ignition sources: Multiple ignition sources, like lightning or electrical faults, can start new fires.

3.2 STAGES OF FIRE

The stages of fire development are:

Incipient Stage: The initial stage of fire growth, characterized by a small, localized fire with minimal heat and smoke.

Growth Stage: The fire spreads and grows, fueled by available combustibles, with increasing heat and smoke production.

Fully Developed Stage: The fire has reached its maximum size and intensity, with high temperatures, dense smoke, and potential flashover or backdraft.

Decay Stage: The fire begins to decline, with decreasing heat and smoke production, as fuel is consumed or extinguished.

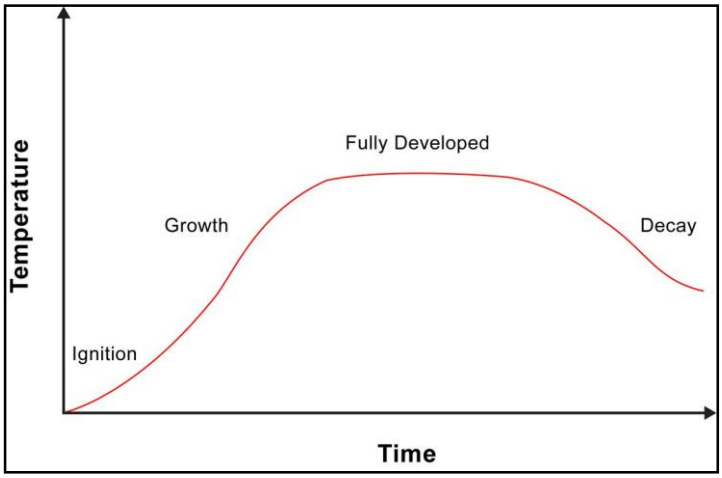


FIG : 1 STAGES OF FIRE

3.3 FIRE EXTINGUISHER OPERATING PROCEDURE

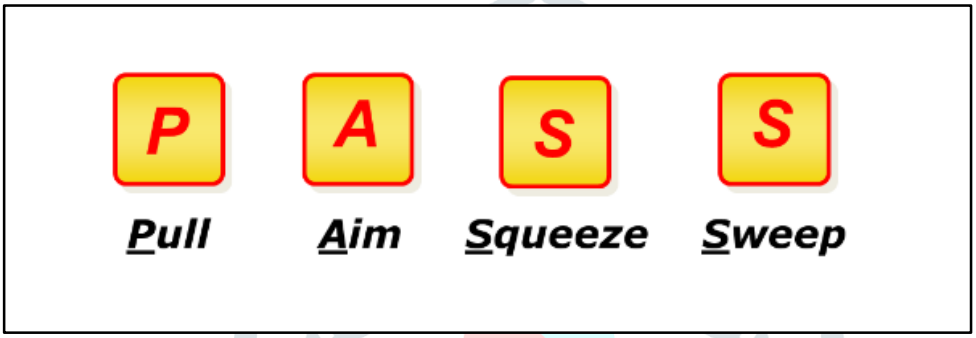


FIG : 2 FIRE EXTINGUISHER OPERATING PROCEDURE

P - Pull:

Pull the safety pin or ring to release the lock on the extinguisher.
This will allow you to operate the extinguisher.

A - Aim:

Aim the nozzle or hose at the base of the fire, not at the flames themselves.
This is where the fuel source is, and aiming at the base will help to smother the fire.

S - Squeeze:

Squeeze the handle to release the extinguishing agent.
This will start to put out the fire.

S - Sweep:

Sweep the nozzle or hose back and forth, covering the entire area of the fire with the extinguishing agent.
This will help to ensure that the fire is fully out and prevent re-ignition

4. INSPECTION OF QR FIRE EXTINGUISHER

4.1 FIRE EXTINGUISHER MANUAL INSPECTION

IS 2190:2010 – Fourth Revision Represent the Selection, Installation and Maintenance of First – Aid Fire Extinguisher

The extinguisher should be placed in all hazard's location. It should be site in such a way that the user may not have to travel more than 15 meters from the site of fire to reach the extinguisher. Similar position on each floor area advisable. And fire extinguisher is not permanent fitting because incase of fire extinguisher pressure or uses immediately change to a new extinguisher for that place. Fire extinguisher access are always free from obstruction.

Check if the fire extinguisher is in its designated area and if it's easily accessible.
Check if the pressure gauge is in the operable range or position.
Check the extinguisher for any signs of physical damage, such as dents or rust.
Check if the pin and tamper seal are in place and undamaged.
Check if the extinguisher is full.
Check the overall physical condition of the extinguisher, including signs of damage, corrosion

or tampering.

Sign and date the annual maintenance tag.

Create a complete report of the monthly inspection that includes the location of the extinguisher, the date and explanations of any deficiencies.

4.2 FIRE EXTINGUISHER INSPECTION WITH QR CODE

QR Code Label:

Affixed to the fire extinguisher

Contains a unique identifier linking to the extinguisher's digital record

Digital Record:

Extinguisher type and capacity

Location

Maintenance history

Inspection records

Expiration dates

User manuals and instructions

Photos and videos

Inspection Process:

Scan the QR code using a smartphone or tablet.

Access the digital record.

Verify the extinguisher's location and type.

Check the maintenance history and inspection records.

Verify the expiration dates (e.g., hydrostatic test, recharge).

Review user manuals and instructions.

Add new inspection records and update the digital record.

Take photos or videos of the extinguisher (optional).

FIG : 3 FIRE EXTINGUISHER QR CODE

4.3 FIRE EXTINGUISHER INSPECTION WITH QR CODE

Open the website or application through online

User Name:

Password:

And login to check the fire extinguisher

We can easily to check out the

Dashboard – overall extinguisher and location

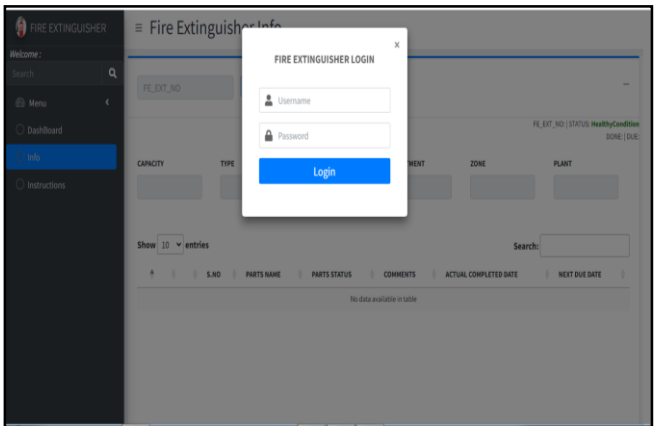
To see the master file easily

Report can be easily check out

User management to watch out a mistake.

To add and remove a fire extinguisher immediately

To check the how many extinguisher inspections on per day



4.3.1 BEFORE INSPECTION

In before inspection we have a card or aluminum tag to punch every three months.
It sometimes card to be missed. We have on problem to find an inspection date and month
And follow a check sheet manually on workplace
In case of check sheet is missed we have not found fire extinguisher immediately

4.3.2 AFTER INSPECTION

We have to paste the QR scanner on every fire extinguisher to easily inspection the extinguisher
Streamlined maintenance and inspection scheduling
Increased safety and reduced risks
Easy to find the errors

Healthy Condition of fire extinguisher
Attention require fire extinguisher
Pending fire extinguisher
Completed fire extinguisher
Year of fire extinguisher updated

Per month plan for fire extinguisher inspection
Overall status of fire extinguisher

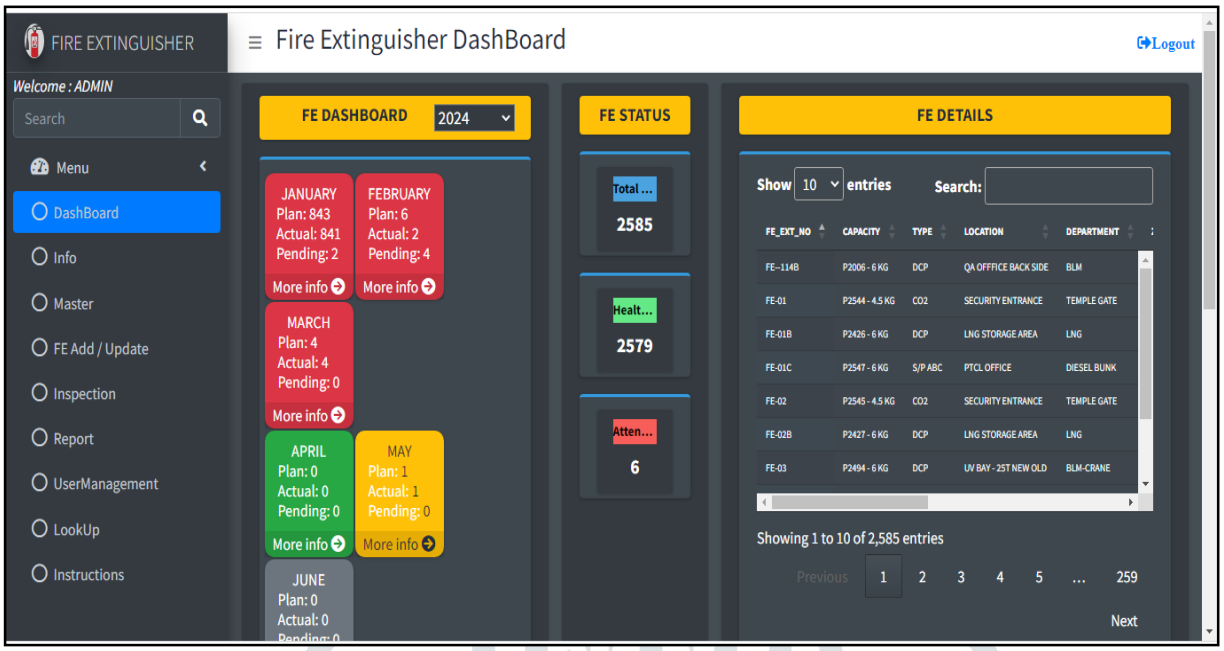


FIG : 4 FIRE EXTINGUISHER DASHBOARD

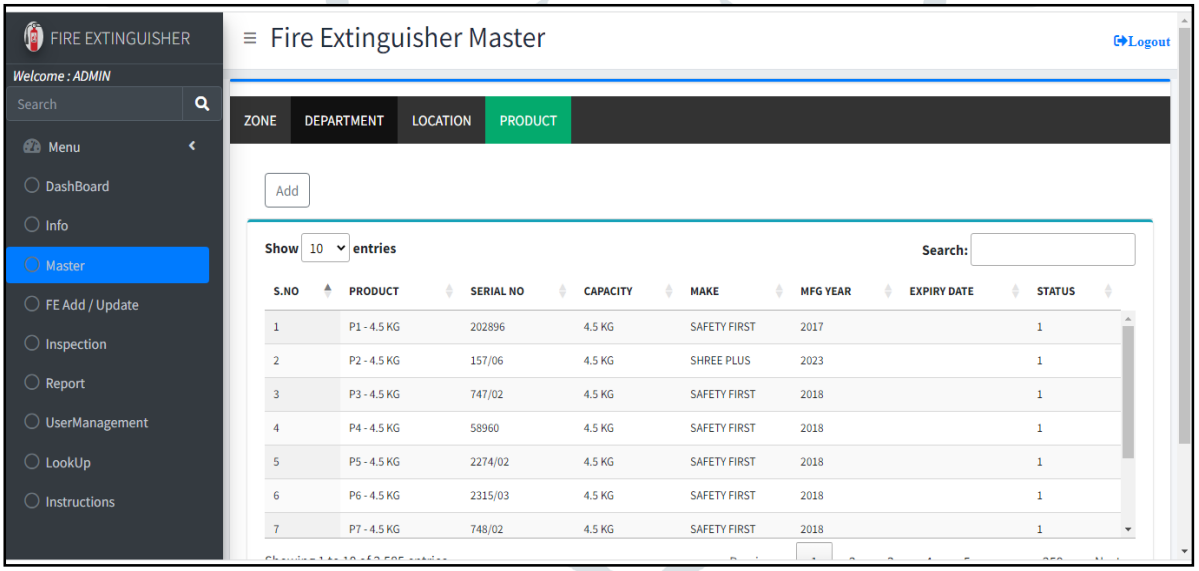


FIG : 5 FIRE EXTINGUISHER MASTER

FE ADD/UPDATE MENU SHOWS:

To add and remove a fire extinguisher
Search the fire extinguisher placed on which department
To find a type and capacity and type of cylinder
To download the QR Scanner Sticker

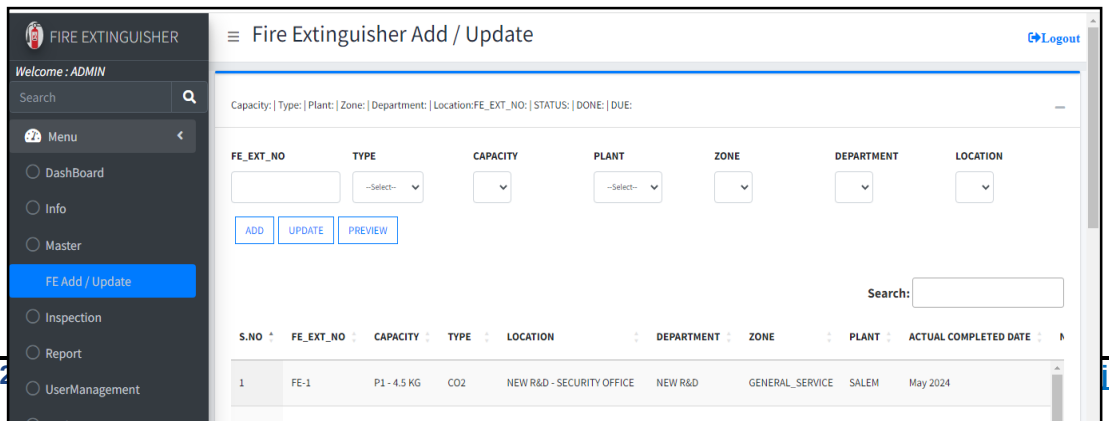
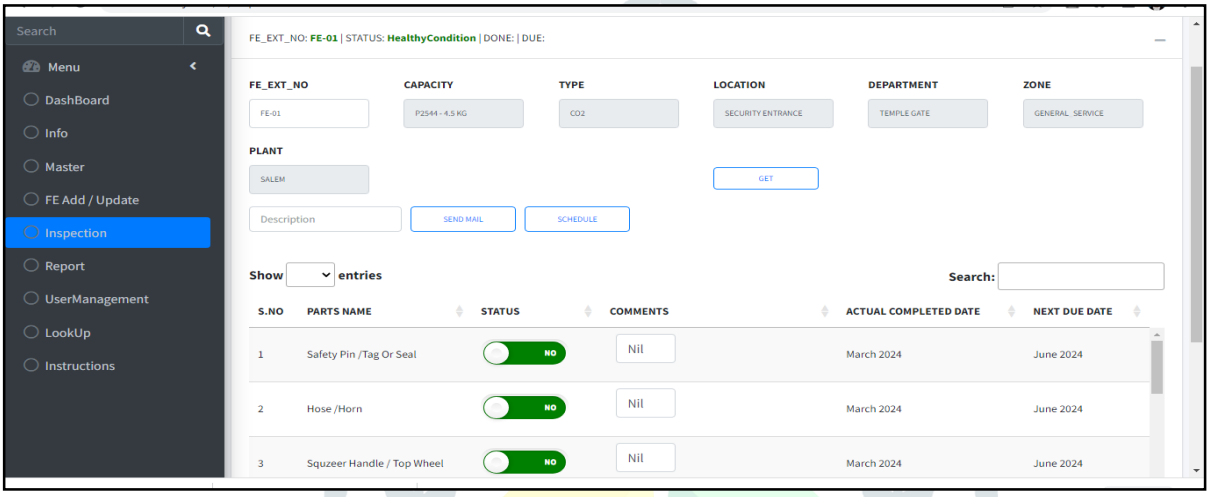


FIG : 6 FIRE EXTINGUISHER ADD/UPDATE

FIRE EXTINGUISHER MENU:

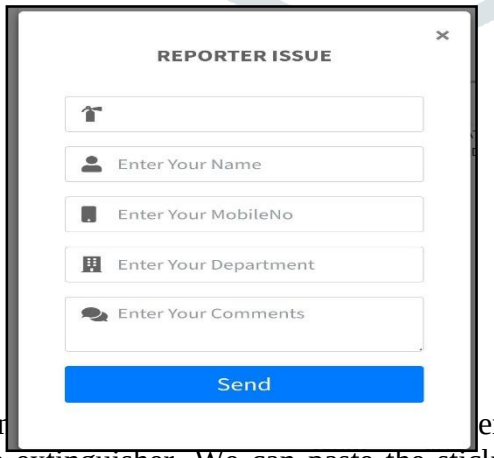
To find the fire extinguisher placed on which department and pending fire extinguisher to be checked. Any missed or complaints to be filled this menu

Fire extinguisher Number:
Type:
Capacity:
Plant:
Location:
Department:



5 RESULTS AND DISCUSSIONS

The fire extinguisher is very to extinguish the fire immediately. But now a days some companies are not inspect the cylinder properly. Because he did not maintain the fire extinguisher check sheet properly. In case of check sheet is missed we cannot find the extinguisher immediately on shop floor. But the QR code fire extinguisher easily find out check sheet to download several times. And data maintained on server every month. In case of check sheet is missed we have to download a check in online.



6. CONCLUSION:

This QR code scan ending and completed of fire extinguisher. To minimize the error of fire extinguisher. We can paste the sticker for all fire extinguisher. And to avoid the writing data of check sheet. In case of any issue of fire extinguisher everyone accesses the QR scanner for using a mobile application to inform immediately to concern department of issue of fire extinguisher. Mail can be received a fire or safety department it takes corrective action and fire extinguisher can be replaced immediately.

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