MiTek Production Tracker System

Introduction

MiTek produces trusses for roofing, at present much of this manufacturing process is documented manually and with minimal detail. This has negative consequences for productivity, costing employees valuable time and making the exact state of production hard to understand. A production tracking system could reduce the burden on employees while simultaneously allowing realtime traceability of every part of every truss as its assembled. This data can be used to further refine production procedures, identify delays and more accurately predict future production times.

Market Research

MRP systems are used in varies of industries, to defend your position in the market you will need an MRP system that manages production and ensure that you deliver the product to the client on time, in full, with no unexpected costs.
Products like Factory Master MRP are used extensively across specialist and precision engineering, aerospace, automotive, component production, food & drink and electronics industries. The benefit of the MRP on time availability of the right materials required for production. Purchase requests can be quickly fulfilled after the customer order is received. Track all steps of manufacturing and the availability of materials. The drawback of MRB Customization Restrictions, Inflexible System; Not Compatible for Specific Organizations, Operation Process Re-Organization and Steep Cost for Installation/Operating.

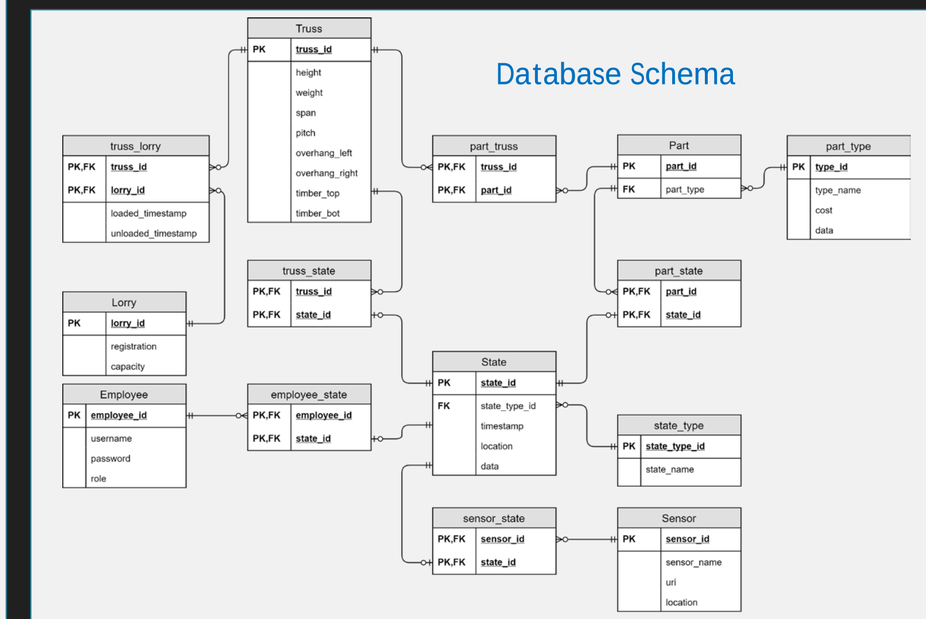
Implementation

Production tracking will be accomplished through the use of a combination of IoT devices reporting to a backend system that uses a PHP server to process requests and organise data into a MySQL database. This backend system will also facilitate a variety of user interfaces, primarily a web based monitoring and notifications dashboard as well as a phone app for manual reporting.

Data

A MySQL database will be used to store and organise the data gathered from the IoT devices and entered by users. Information about trusses and parts of trusses is stored as a "state" recording a full history of its production. The system also allows for full traceability of which users or devices created each "state" report.

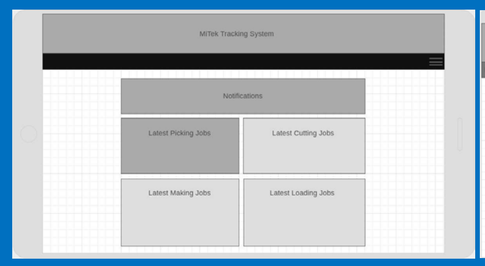
Database Schema

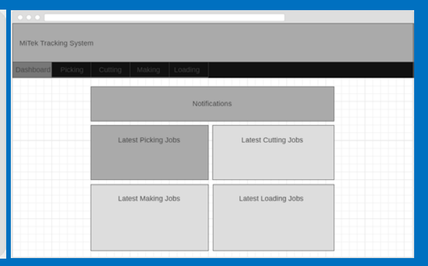


User Interface

The software will be developed as a web application and mobile application. HTML5, CSS3, JavaScript and JQuery will be used to design the front-end. The website will be fully responsive for tablets and mobile, will be event-driven, intuitive and have a good user experience. Structurally, each page will have a top navigation menu, main content area and footer.

The software will be able to run as an Android app using a web container. The app will be built using Java.





IoT Staging System

LoRa is a low-power, wide area network protocol capable of transmitting and receiving data within a 20Km radius (in an open-area). The protocol itself is intended for IoT applications and serves as a power efficient alternative to present solutions. In the LoRaWAN (Long-Range Wide-Area Network) scope, LoRa nodes are typically bridges transmitting data from various sensors to the central hub, also known as the LoRa gateway. A LoRa gateway is capable of interacting with multiple devices at the same time, maximizing efficiency, as no more than one gateway is typically needed within the 20Km coverage limit. A LoRaWAN is to be deployed allowing multiple sensors to communicate with the cloud. The network is connected to the database through a local or external connection.
An RFID scanner is to be built using an MIFARE compatible scanner, an 8-bit or 32-bit Microcontroller and the Microchip RN2483 LoRa transceiver for communication. Sleep mode for the complete assembly is implemented to conserve power while the device is not in use and could wake upon activation.

Project Budget

Web Development	Estimated Cost
Web Setup Cost	£160
Designing And Building Web Structure	£3925
Training To Use Website	£471
Maintenance Cost	£392
Total Estimated Cost	£5340

Hardware Costs	Price per unit
Arduino Mega 2560 R3	£13
Microchip RN2483	£13
20x4 LCD display	£7
MFRC522 RFID module	£2
868MHz Antenna	£2
Total:	£37

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