

Sri Lanka Institute of Information Technology

**Metal Crusher Management System**

Project Proposal

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**1.Introdution**

**1.1 Overview**

For the first time in the field, we have an opportunity to fully computerize a fully functioning metal crusher site. Since this is new to the field our team have to think freshly and design the way to program the functionalities of the site. The vast range of roles in the site should be implemented in away that it should blend with the culture, adaptive rate, experience and the computer knowledge of the employees in the site.

This desktop application has the ability to monitor the needs and wonts of the vehicles and the machines in the metal crusher accurately by allowing owner, department managers, engineers, technicians and other employees to do their task without any delay. So, we can assume that through the process of digitalization the site can earn more profit.

This system consists of main functionalities as vehicle, generator, crusher, hammer, compressor, loader and the excavator maintenance and management, employee, sales and stock management. This system allows the owner to make decisions effectively and accurately.

As the conclusion we can agree that our client Herath metal crusher can move from books and manual registers to modern and updated version which increase the accuracy of the functionalities as well as the speed of accurate decision making. With the digitize management system as well as the experience more than 15years the company have the ability to increase their profits and can stay in the competitive business world for a long time.

**1.2 Company/Client Background**

**Herath Metal Crusher** is our chosen client for the project of Metal Crusher Management System. It was built up in 2006 and is situated in Madawachchiya, Anuradhapura. Currently, a manual system is being used for the usage of handling the metal crusher process. Our aim and plan is to build up a new automated system for the metal crusher to manage all their processes efficiently and conveniently. It is situated in a land area of 5-acres.

We discussed with the client, and we shared all our ideas and views of this system. Especially we talked about the parts that can be automated in the metal crusher. He also gave his ideas on what he needs us to do. He has a big plan to build up within this system. His plan is to continue this project with the help of us, until a complete system is been created. Even after the ITP project, we thought of continuing to give our hands on him to make this system a success. Herath Metal Crusher has 35 employees working under them. When we consider the main machinery and vehicles used in this metal crusher site, there are two crusher machines (mini crusher and cone crusher), 6 compressors, 10 hammer machines, 11 excavators, 2 loaders and vehicles including 5 lorries and 2 bolero trucks functioning in this metal crusher. Clients from all over the country come here as they one of the pioneers in metal crusher industry.

Metal crusher Management System to Herath Metal Crusher is a system which helps metal crusher’s maintenance management, administrative tasks management and all the other necessary metal crusher management features. This system is designed to do automate maintenance details about machines and vehicles, manipulate their payments, to handle staff and inventory including spare parts, oil, worker uniforms, tools and other small machinery. Managing all the salaries of the staff and controlling all the stocks and supplier process are also done here. Mainly all the financial remedies are smoothly and swiftly controlled with the hope of forecasting their metal crusher to an optimum peak. In general, this metal crusher management system facilitates the main processes in a metal crusher.

**1.3 Problem Statement and Difficulties they face**

Currently the company does not have an automated system to manage the things. The Plant Manager is a very busy person obviously, so he doesn’t have enough time to sit and manage the entire activities on papers and files. But now as they have no option, they use their manual system to run the crusher processes. Even all the selling and buying transactions including supplier details are recorded manually in invoices and documented into files. All the payments are handled manually through recording in a separate book. The entries of the buying and selling are entered then and there by the staff. The invoices are filed according to the invoice number and documented separately as purchases and sales. Manual documentation of sales and purchase invoices would lead to incorrect calculation of inventory. The problem of maintaining massive number of files which lead to take up space in the building has become one of the major problems at the metal crusher currently. These hardships should be minimized as soon as possible.

Furthermore, there is no proper update on the resort or its inventory. There’s an insufficient handling of finances and payment roles. Sometimes overlapping of bookings occur due lack of updates and misplacements.

The company needs to provide the method sheets and descriptions regarding deliveries and payments when customers requires them and also about supplies, stock and other additional information. But it is impossible to directly get them and also, which makes the service so slow and inefficient. The employees find it difficult to access the supplier details and it’s difficult to manage the payment details when there is a massive amount of transactions together. Duplicate entries are made when writing on invoices and spelling errors might lead to entering to wrong customer’s or supplier’s name.

Since the cash payments are handled manually, the month ended balances might not tally at some situations. The files and invoices tend to get misplaced sometimes and it is unable to store the information. Limited space available to store the physical stack of files and cannot throw away the previous year files which could be needed anytime. It also wastes time when finding an invoice for information.

Moreover, currently the employee attendance is recorded manually and thus their respective wages are calculated according to those manual records. As our client says, it is possible for the employees to get their attendance marked falsely at the current situation. And that may lead in paying them an additional amount which is totally in vain.

There are so many problems and difficulties faced by the crusher currently, due to the lack of a proper automated system.

**1.4 Proposed Solution**

As a solution for the above-mentioned problems and situation faced by the client company, we as developers have decided to develop an automated system to make the company process more reliable and accurate. The manual system which is currently used by the client company is time consuming and brings out a low performance. Hence these matters would be solved out through the proposed system.

The proposed system allows its staff and all users to enter all the spare-part details, service details, repair details which are related to its machines, vehicles, and inventory to be stored for later use. So that the data entered would be stored in an order and also the information will not be misplaced. For more protection, a backup system can be maintained.

This system will also solve the problem it has with the lack of space, which the massive number of files fill up. All the data entered will be stored in the database of the proposed system. The information of this system can be accessed by any managerial level in the company but through security credentials.

We have so many proposed solutions to bring this metal crusher into an optimum level.

**2.Benefits**

**Ensure Maintenance of Data Integrity**

In the same way how, documentation is done manually is done here too, but within an automated system. All the information regarding the stocks, salaries, customers, employees, finances, supplier details and payment management of the company are stored document-wise for each month. The documents are stored and the users can retrieve documents for reference. The documents are well maintained by the system and systematically organized which makes the user to understand the data contained within them. All the documents of the system are alphabetically stored and listed within the computerized system.

**Stock can be monitored easily**

The major problem of possessing duplicate data in the manual system is restricted in the automated system. It would notify the user when entering the same data twice to the system and make sure the errors are easily identified. The system will be processing at an optimum level by helping the users to store only the relevant to the system

**Ensure Security of the System**

The Inventory Management System is developed to manage regular operations with unforeseen break-downs. The system seek permission to save a backup copy before user shuts down the system after work. It provides users with logging credentials which includes a password and a username. According to designations and managerial level the logging credentials vary from user to user. Include functionality such as resetting the password and disabling a key to sign in.

**Allows Access for Different Managerial Levels to the System**

Not only the manager operations who handle the transactions have access to the system, but also the general manager and the sales representatives, even though when extracting information from the device, various restrictions may occur for different levels.

**Machine maintenance could be done on time**

System notifies the users about the next service date of the machines according to the given past service dates and it also notifies to repair some crucial spare parts. (Those spare parts can use only for limited amount of time after that those needs to replace or it would be very harmful to workers and machines)

As example excavators needs to replace hydraulic jacks twice a month to get the best output.

**Stock can be monitored easily**

System update stock details when stock refill and when accessories used from stock for machines, if quantity becomes lower than 5 system notify message to the user. This will organize stock really well as they don’t want to go to the store every day and buy missing part. (This is the way they do now with the system things will be much easier)

**Could obtain past delivery details whenever needed**

One of the significant figures of the system is generating reports and analyze past records so the managers can take their decisions easily and effectively, Users can get reports in many ways like specific day, specific vehicle and etc.

**3.System Overview**



**4.System Functions**

The main important things of this system are machines, this is one of the biggest cites in the country so they have wide variety of machines and vehicles for exports, and stock management is also a big part in the system while there are more functionalities to manage sales, employees, admins.

8 developers divide among those functions to implement effective system among those required functions with the user requirements.

**4.1. Vehicle Repairing, Workload and Maintenance Management of Vehicles**Vehicles in the metal crusher site are a major aspect of the metal crusher management system. Vehicles are used for most of the daily activities in the crusher site. The main task of this function is to keep track of metal crusher site’s vehicles service, workload, maintenance, and repair details and with it enhance the vehicles service and repair process so that the owners can do the services, repairs timely. By using this function, it is also needed to add new spare parts, service details which is adding the newly arrived spare part models to the system and add existing spare parts, service details which is adding the existing spare parts which are damaged or exceeded usage period. It is also needed to update existing spare parts, service details if user wants to make some updates for the spare parts and delete existing spare parts, Service details if the user need to remove unwanted spare parts. These spare parts are sorted by its name or id. It is also needed to generate reports regarding the vehicles repair, service details for the given time period for an effective business process of the metal crusher.

**4.2. Metal Crusher Machines Repairing, Workload and Maintenance Management**

Metal crusher is the core of the cite so repairing and maintain metal crusher is a very crucial system. Suppliers can add metal crusher spare parts to the stock and that information will be saved in a database that maintain by the system.

Main function would be that users would need to see the expenses that they spend specifically for the Metal Crusher spare parts in a specific time (ex: daily, monthly, yearly, given date).

Users want to update database when they restock the metal crusher spare parts at the end of the month.

Users want to check whether the wanted spare part is available in stock, if available notify them and reduce the quantity and if not available notify them to buy that from a store.

Users want to delete spare parts if they will not import that again.

Users want to sort the spare parts by its name or id.

**4.3. Loader Machines Repairing, Workload and Maintenance Management**

In the loader function we recorded total number of the loaders in the site. we used an ID system to identify loaders. We can know the current condition of the loader (in running condition or not) according to loader ID.   
Our main focus is to record every service time and repair details in the system. we can enter a new entry to system for each repair and services. Also, we want keep the record of loader repair equipment and current stock of the relevant equipment. If the there is any inactive loaders, we can enter an entry about the issue of the inactive loaders. By using the system, we can add a new loader or we can release loaders from the site. we can see the condition of the loaders.

In the loader functions we can generate a report to system which provides an all the expenses spend to loader services and repairs. Report will be sorted for weeks, months and years. By using the details in this report, we can know upcoming services and repairs for each loader and the record of expenses spend to each loader separately.

We can Keep a track on the needed equipment and current stock of those equipment.

**4.4. Sales Management and Generator Machines Repairing, Workload and Maintenance Management**

In the sales function the main focus is to record the details of the customers and the sales associated with them. The sales managers can enter, update and delete the data associated with the customers. The sales assistants and other sales department employees can view and enter the sales associated with the particular customer. The system generates a sales document in graphical notation which represent the rate of the sales associated with a particular customer. At the end of the month the system generates a graph which display the sales done in the month relative to the previous months.

Since the generator is the power source of the metal crusher, we have to maintain a system to store the parts associated with the generator. The system has a section to enter the provided amount of desal for the day and to enter the remaining amount of desal at the end of the day. These details are used to create a graph which represent the consumption of the desal daily to predict the repairing dates of the generator. It is very important to maintain this chart and the stock amount to increase efficiency and to run the operations of the site on time. The desal distributor can enter the amount of desal and the generator operator can enter the amount of desal remaining. The graph can be viewed by any employee with basic data enter level access.

**4.5. Administrative Tasks and Employee Attendance Management**

This function is mainly focused on how to get a clear track of the employee attendance to the site. We implement a biometrics sensor to record the TIME IN and the TIME OUT of each employee. Therefore, using this system we would be able to make our client sure that accurate employee wages can be calculated using this proposed system unlike using books to record data. Using this system, we can even check the attendance details of a respective employee/employees at a latter day too. Once an employee joins the site, his data is filled in a form and stored in the database. Therefore, the owner can get employee details in need as well, if certain details are changed, the details could be updated, and in case if an employee’s details are no more required, thus details can be deleted as well.

The Administrative Tasks function is mainly to assign admin roles through the system by the owner in order to let them carryout the tasks within the system. Using this function, it is able to add new admins, update their data, and delete admins once it is needed for them to be deleted as well.

**4.6. Hammer, Compressor Machines Repairing, Workload and Maintenance Management**

By using this hammer and compressor function we can identify the hammers, Air Compressors differently by dividing according to their given id number. After each repair and services we provide and entry to the system to keep and accurate record of the hammers and air compressors. Using these details will help us to estimate next dates of the normal services of the machines. Chisels of the hammer drill needs to be replacing twice a month and notify the next replace date to the user after two weeks. Generate reports according to the hammers and air compressors expenses regarding the machine repairs and spare parts. System will generate a report which include service details and expenses spend to hammers and air compressors daily monthly.

**4.7. Excavator Machines Repairing, Workload and Maintenance Management**

Excavators are heavy construction equipment used for construction as well as it is also used for stone breaking and digging. The main task of this function is to record the expenses in maintaining the excavator, the expenses spent on the spare sparts of this machine and details about each excavator separately. Each excavator has an ID, type, main task and the next service due (service is done according to work hours). User can update and delete this information when needed.

User can check the availability of spare parts in the storage, if the desired spare parts are available the system will notify the user and if they are not available the system will give an alert message saying that the storage is empty for the specified spare part. Every time a spare part is taken from the storage, the count of the specified spare part will be reduced.The database is updated by the user every single time when a spare part of the excavator is restocked.User can update spare parts if needed and delete spare parts which are no longer needed.These spare parts are sorted by its name or id.

**4.8. Other Remaining Items in Stock Management**

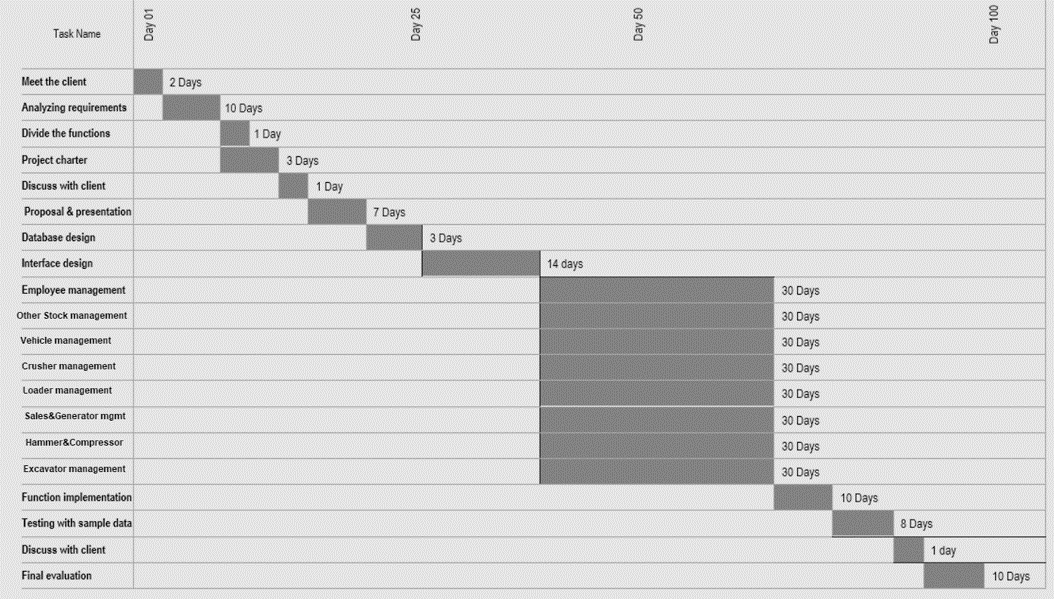
This module’s major role is stock maintenance. This feature involves monitoring all available stocks and showing them according to availability. Stock manager also has the ability to search for any stock using the search option.

This module allows the Stock manager to check what is insufficient in the store and once the stock quantities reach the minimum stock levels, store manager will be informed that the stocks have reached the minimum levels via a warning message.

A daily report is been created to display the daily usage of the stock and furthermore, a monthly report is been created to display the stock which has been used and at the end of each month, users of the software will be able to identify the remaining stock balances and the reports can be converted into softcopies or hardcopies through the software as well.

**5.Tools & Technology**

* Planning to use software s like,
  + 1. Eclipse – for IDE to code implementation
    2. Java – as a programming language
    3. Scene Builder – to develop the UI / UX
    4. MongoDB, MYSQL – to create the database
    5. Develop a desktop application using JavaFx frame work.
* Other necessary libraries will be used to create quality UI and UX

**6.Gantt Chart**

**7.Work Distribution**

|  |  |  |
| --- | --- | --- |
|  | **Name with Initials** | **Brief Description of the Function** |
|  | Ravinda Anjana S.A. D | **Vehicle Repairing, workload and maintenance management of the vehicles used in the crusher.**  **Add New Spare parts, Service details:** Adding the **newly arrived** spare part models to the system.  **Add Existing Spare parts, Service details:** Adding the existing spare parts which are damaged or exceeded usage period   * Engine oil – DS40 * Oil Filter * Air Filter * Diesel Filter * Coolant 4 Lorry, 2 Bolero   **Update existing spare parts, Service details:** if user wants to make some updates for the spare parts  **Delete existing spare parts, Service details**: remove unwanted spare parts  **Report Generating**: Generate reports regarding about spare part details and the transaction made |
|  | Dakumpitiya D.A.L.C | **Metal crusher machines repairing, workload and maintenance management**  **Add New Spare parts, Service details:** Adding the **newly arrived** spare part models to the system.  **Add Existing Spare parts, Service details:** Adding the existing spare parts which are damaged or exceeded usage period   * Jaw Plates – Changing month to month * Tockle Plates – Changing month to month * Crusher Belt – * Hydraulic Oil   **Update existing spare parts, Service details:** if user wants to make some updates for the spare parts  **Delete existing spare parts, Service details**: remove unwanted spare parts  **Report Generating**: Generate reports regarding about spare part details and the transaction made |
|  | Bandara S.A.C.J. W | **Loader machines repairing, workload and maintenance management.**  **Add New Spare parts, Service details:** Adding the **newly arrived** spare part models to the system.  **Add Existing Spare parts, Service details:** Adding the existing spare parts which are damaged or exceeded usage period   * Filters * Injector * Nut & Bolt * Bucket Tools   **Update existing spare parts, Service details:** if user wants to make some updates for the spare parts  **Delete existing spare parts, Service details**: remove unwanted spare parts  **Report Generating**: Generate reports regarding about spare part details and the transaction made |
|  | Wijesinghe W.A.K. R | **Sales management and Generator machines repairing, workload and maintenance management.**  **Add new customer**  **Update existing details of the customer**  **Delete existing customer**  **Report Generating**: purchase report  **Add Existing Spare parts, Service details:** Adding the existing spare parts which are damaged or exceeded usage period   * Lube Oil * Fuel Separator * Nanonet FF Cartridge   **Update existing spare parts, Service details:** if user wants to make some updates for the spare parts  **Delete existing spare parts, Service details**: remove unwanted spare parts  **Report Generating**: Spare part details and the transaction made |
|  | Nigamuni M.M. S | **Administrative tasks and employee attendance management.**   * **Fingerprint Sensor Implementation to record attendance:** Employees must record their TIME IN and TIME OUT using a fingerprint scanner and the relevant data sent to the DB. * **Administrative Task Management:** The assigned admins can log into the system to do any task in the system. * **Report Generation:** Reports are generated using the data in the system when needed |
|  | Kadigamuwa A.S.T.W.M.R.R. W | **Hammer, Compressor machines repairing, workload and maintenance management.**  **Add New Spare parts, Service details:** Adding the **newly arrived** spare part models to the system.  **Add Existing Spare parts, Service details:** Adding the existing spare parts which are damaged or exceeded usage period   * Coolant * Filters * Injector repair kit * Engine repair kit   **Update existing spare parts, Service details:** if user wants to make some updates for the spare parts  **Delete existing spare parts, Service details**: remove unwanted spare parts  **Report Generating**: Generate reports regarding about spare part details and the transaction made |
|  | Mithsara K.A.G. N | **Excavator machines repairing, workload and maintenance management.**  **Add New Spare parts, Service details:** Adding the **newly arrived** spare part models to the system.  **Add Existing Spare parts, Service details:** Adding the existing spare parts which are damaged or exceeded usage period   * Filters * Hydraulic Horse * Injector * Jack Seal * Track Line * Nut & Bolt * Bucket Tools   **Update existing spare parts, Service details:** if user wants to make some updates for the spare parts  **Delete existing spare parts, Service details**: remove unwanted spare parts  **Report Generating**: Generate reports regarding about spare part details and the transaction made. |
|  | Ariyathilake H. L | **Other remaining items in stock management**  **Add New Spare parts, Service details:** Adding the **newly arrived** spare part models to the system.  **Add Existing Spare parts, Service details:** Adding the existing spare parts which are damaged or exceeded usage period   * DS40 Oil – 1 Barrel 200 liter * Jack Seal * Coolant * Engine Tool kits * Fuel Filters * Oil Filters   **Update existing spare parts, Service details:** if user wants to make some updates for the spare parts  **Delete existing spare parts, Service details**: remove unwanted spare parts  **Report Generating**: Generate reports regarding about spare part details and the transaction made. |

**9.Appendix**