Combined AMS/CMMS system

Purpose: Build a combined Asset Management and Computerized Maintenance Management system. This will allow full tracking of all costs related to facilities assets as well as be able to manage the maintenance required and related costs for that maintenance. An asset can be any piece of equipment or resource that a facility has or maintains.

Problem this fixes: After the hurricane that ravaged New Orleans, FEMA had serious issues trying to inventory and evaluate the costs of mostly public utilities and has started pushing for asset management for all public facilities as well as some private facilities to be able to determine cost of equipment lost due to national disaster and what equipment might be needed to get a damaged public utility back online after such a disaster. Many facilities have also been tracking costs of maintenance for equipment to predict when replacement might be better than repair and what items are costing more money and might be best served to be replaced with new, more efficient or more durable equipment. AMS software generally tracks approximate costs related to assets within the system and CMMS software generally only tracks maintenance to those assets. This project aims to bridge these two types of systems together as one providing more efficiency and usability to the user of both types of programs. Currently data gathered from the CMMS has to be imported into the AMS or estimated for costs. Because these systems are combined together in this project other related components can be added as well to make a simplified nearly all in one solution.

Potential expansions: The basic system will involve mostly hand entered information and possibly information gathered from manufacturers into a master library. Due to limitations for fitting this project into a semester these are listed as potential expansions but not intended for inclusion in the initial project. Potential expansions could include an export system of labor time into a payroll system. Since payroll systems are generally unique entities on their own there would be no attempt to incorporate a full payroll system. Another potential expansion is automation of work order creation from external sources. The intent of this expansion would allow outside sources such as alarm events from a SCADA/ICS source to initiate automatic creation of work orders.

Integration: The main intent of this combination project is to integrate most of the components used in a day to day operation that currently are separate and tedious to use as has been demonstrated to me by my personal use of similar packages for past 20+ years and feedback from companies I have talked with at seminars and expos related to public utilities I have gone to.

Implementation: To implement this project the plan is to use C# for its rapid code creation with ASP.NET to provide the web interface. This combination will allow the quickest implementation of this system as well allow for potential of using AZURE or other entities. The main databases in consideration are MySQL, MSSQL and Oracle. The program can be built as database neutral allowing whatever database the client prefers or may already own. ASP.NET is also supported under Linux and with Microsoft’s recent membership in the Linux foundation support for ASP.NET within Linux should grow allowing the application to be hosted on a Linux or Microsoft host. Using a web page interface allows usage of the application from just about any client including phones, tablets and PC’s.

Licensing: My initial thoughts on monetizing this project is to provide site licenses based on size of the facility (Workers employed). To provide demo for the system an online host can be used to tinker with the system since it will be designed to run from a web site. Minor updates could be provided at no cost but major revisions may require an update which would require an additional license fee. Additional money could be made by setting up the system for the customer and potentially setting up a cloud based server (Azure?) if demand for it. Initial exposure can be made by making announcements to different industry magazines, as well as mentions to industry groups that are looking for products like this for their member’s locations. Additional advertisements could be purchased in industry magazines and social media such as LinkedIn or facebook.

Modules

The following entries will attempt to describe the intended modules for this system in no particular order. A brief explanation of the intended use of the module and possible interaction with other modules are included.

Main modules:

Asset Library – Contains description of types of equipment including maintenance procedures and related parts listing for procedures. This is a generic list and may contain equipment not installed in the facility but should contain all equipment in the facility and include specifications and related information. This is intended to be a generic building block for use by facilities in general. For different types of facilities using this one could have a different library.

Asset Inventory – This would be a listing of all the equipment currently installed or potentially in use. It will be linked to the Asset Library and use the information included in the Library when necessary.

Stockroom Inventory – Inventory all parts available to do work or replace components. Replacement equipment or parts to repair equipment will have links to the related Asset Library entries. Ability to have parts requested from an order to do work which will then allow the stockroom to have the parts ready for pickup or allow for immediate ordering if not in stock and inform the worker doing the order for work on the status of parts. Also will allow orders to be placed using suggested vendors and pricing if available.

Work Order Management system – Allows work orders to be opened, Status updates, when work order assigned it will allow worker to order parts necessary automatically and inform worker the status of the parts if not all parts are in. When work is completed the time used to do the work is logged to the work order. Work orders can be automatically scheduled for planned preventative maintenance. A priority system will be included to be able to prioritize what work needs to be done first with ever increasing priorities for some normally lower priority work orders that have been sitting in the que for an extended period of time.

Additional Modules (To be added if time allows. Also relate to other modules in some manner):

Time log and leave calendar – This will allow labor to be itemized by the workers. When a worker does work on a work order that time will automatically be logged to the time log. Worker will also be able to itemize work done by necessary codes for proper accounting for other work done. Worker will also be able to make requests for time off and anyone can look at the calendar to see who is scheduled to be off etc. The completed time sheets can be printed off at whatever time interval required or can be exported for importing into a payroll program. Export template system will need to be created to allow easy setup for importing into payroll systems.

Electronic Logbook – This will be tied into the Asset Inventory and allow entries to be made about them. When a work order has been completed that relates to a specific asset it will be logged automatically as well. Other logbook entries will be able to made manually. The intension of a logbook like this is to list equipment that is out of service for some reason, log events that have happened such as a pipe breaking or some piece of equipment not working properly. Could also log receiving of chemicals or any other item that a facility would like to log on a daily basis.

External Event system – Allow work requests to be created directly from a detected event. This is intended to be implemented with a SCADA/ICS system but could be used with any system that can take advantage of auto generation of work orders. Assuming project progresses fast enough current SCADA software makers will be contacted to try and make a system that can integrate with their software. Likely will be network service oriented.

Asset Library sharing – This may incorporate an update system that allows adding to or modify current Asset Library offerings.