# An Automated Timer System That Maintains Crew Details: Crew Timer System

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***Abstract— This paper highlights the development of an automatic software that maintain the crew details, crew schedules and priority of the crews in Indian Railways according to sections using an auto Timer System, that uses J2EE technology. It is also used to find the status of the crew and their working hours in the division using indicators. The software has five modules that are named as Loco info, Section points, LP Schedule and Priority, Remainder and Graph module, Loco Inspector Movement. The software helps in maintaining and retrieving the crew details. The auto timer system which is the heart of the software maintains the information about the number of working hours. If the number exceeds eight it automatically relieves the loco pilot of his duty by sending him an SMS. The number of working hours are extended depending upon the will of the loco pilot.***

***Index Terms— Crew, Loco Pilot, Section, Loco inspector, Crew Timer.***

## I. INTRODUCTION

Crew Operating Timer System forms the vital core function of train operation of Indian Railways. Timely availability of the required crew is the most elementary requirement of the train operating system. Successful train operation depends on the proper and efficient utilization of the running staff.

Crew consists of various combination of running staff in different categories depending on variety of factors like type of service, traction. The Indian Railways has approximately 1.05 lakhs running staff based over 300 crew locations, forming the most important human element directly involved in the freight operations. Wages of running staff are much higher than that of average railway staff. Crew cost therefore is very high and it is imperative that crew is utilized effectively. Train crew is also known as Running Staff Further there are two types of Tractions Diesel and Electric(Steamed being Phased out).

The running staff is classified as continuous and the duty period per week is 52 hours (104 hours in a fortnight).The running duty at a stretch should not ordinarily exceed 10 hours from the train departure.

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Loco info includes the complete loco details like type of the loco, name and number of the loco. It is also used to know that how many types of locos are present at a particular division according to the sections. Section points include the complete section details. It also maintains the list between the sections. LP Schedule and Priority modules includes to know the schedule of the loco pilots using the auto remainders in different sections and to know the priority of the loco pilots using auto timer system.

Remainder and Graph module includes the auto indicators to identify the movement of the loco at odd hours. It is also used to generate the graph automatically by entering the time at different stations based on the section wise. Loco Inspector Movement module includes the complete movements of the loco inspectors according to section wise through online. This module also used to know the repair schedule of the loco.

## II. PURPOSE OF THE PROJECT

The project proposes a new method in which the crew is assigned duty and relieved from it automatically. Unlike the existing method, where the crew is manually logged in, given the sign in and sign off timings and so on, the present system relives the pilot of his duty once the eight hours starting from his sign in time are over. In case he wants to work over-time the timer automatically sets his over-time for two hours and after the completion of his duty the auto timer system sends him an SMS, thereby relieving him. The maximum numbers of hours a loco can work are twelve including his over-time. The system proposed is explained through various terms as below.

**Crew Scheduling:**

Crew has to be called two and half hour to three hours prior to the scheduled signing on. Signing on is a physical act when the staff presents itself at the place of the duty at the scheduled called time. Crew scheduling requires ear marking of individual staff for every requirement. The requirement may be:

- Daily train arrangement, which is based on shift wise/daily train schedule given by the control.
- Schedule for pilots, waiting duty staff etc.(this schedule normally does not change on day to day basis the expected duty hours of such staff may vary and is given in the schedule).

**Serving call:**

Call-books are sent to running staff 2 hours before reporting time. Calls served only to those running staff staying within 7-8 kilometers radius of the lobby.

Staffs on fixed roster or passenger link are not served calls. Other running staffs are required to report on their own if they stay outside the distance. However the staff staying within 7 kilometers radius is invariably served calls during night-time (22-06 hours). Out station staffs resting in running room are also served calls.

**Sign On:**
Crew signs ON before departure of the train by entering the time of reporting to the lobby. He reports for duty at a predefined time before the time mentioned in his call.

Crew reports for duty 45 min before departure of engine from shed.

- Crew taking over charge shall report 30 min before departure of train.
- For crew sign ON for a main line train shall be 15 min.

After sign ON the running staff in the presence of lobby

Supervisor does the following actions:

- Performs breadth analyzer test.
- Reads and acknowledges the circulars like technical, safety etc.
- Checks the display of caution orders in the section he is going.
- In case he is fit with spectacles he conforms that he is carrying spectacles with one spare one.
- Confirms that he does not have shortage of any tools or safety equipment.

**Sign off:**
Crew signs OFF normally within 15 min of the departure of the train. In case there is a yard terminating load or a power changing activity the time limit within which the crew has to sign OFF from the train arrival time is decided by the lobby supervisor.
While signing OFF, the driver is required to do:

- Enter the Train number, Arrival time, and sign OFF time.
- Report track and signaling defects/irregularities noticed on run.
- Perform the breath analyzer test.
- Opt for 6 hours at out.

## III. SYSTEM SPECIFICATION

The requirements for the project are as follows:

### A. Hardware Specification

- Processor : Pentium Dual Core
- RAM : 512 MB and above
- Hard Disk : 40 GB and above.

### B. Software Specification

- Operating system : Windows XP
- Front-End : JSP's
- Back-End : Oracle 10g

Software Tools used for this system are Netbeans Ide 7.0 and Adobe Dreamweaver

## IV. APPROACH FOLLOWED AND EXISTING METHOD

**Approach:**
This system is built using spiral model approach of the software engineering.

The spiral model is a software development process combining elements of both design and prototyping-in-stages, in an effort to combine advantages of top-down and bottom-up concepts. Also known as the spiral lifecycle model (or spiral development), it is a systems development method (SDM) used in information technology (IT).

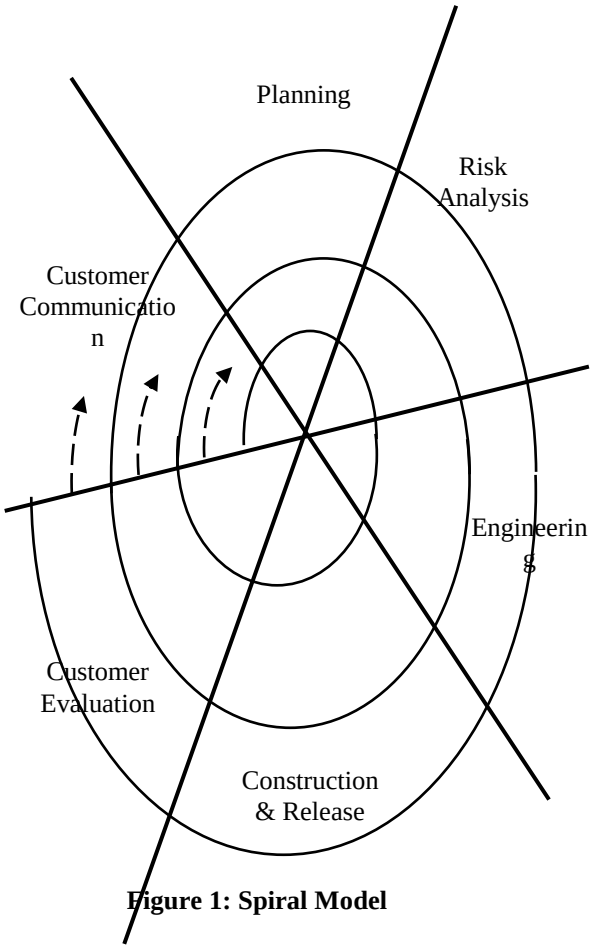


**Figure 1: Spiral Model**

**Existing Method:**

he Crew Operating Timer System that exists now is a manual process. The information regarding loco pilots, the locos they are assigned, sign-in/off duties is recorded in the registers. The working hours of locos pilots, Pre-arrival detention and pre-departure detention etc. are calculated manually. Manual processing is more in the existing system, which makes the tasks complicated and time consuming. It is even tedious process to generate reports.

At present provisional duty list is prepared every day which names each and every staff of that depot station wise and status is updated as and when inputs are received. The crew scheduling is done with the help of this duty list based on criteria set according to the requirement, this list is finalized to be used as a guide for knowing the daily status for master roll.

## V. MODULES

The functional requirements of the Crew Timer System
1. Loco Info
2. Section Info
3. LP Schedule and Priority
4. Remainders and Graph
5. Loco Inspector Movement

**Loco Info:**
This module includes the complete loco details like type of the loco, name and number of the loco. It is also used to know that how many types of locos are present at Vijayawada division according to section wise.

**Section Info:**
This module includes the complete section details. It is also contains the station wise list between the sections.

**LP Schedule and Priority:**
This module includes to know the schedule of the loco pilots using the auto remainders in different sections and to know the priority of the loco pilots using auto timer system. The crew will **sign-on** in one station and **sign-off** in another station based on the sections.

**Remainders and Graph:**
This module includes the auto indicators to identify the movement of the loco at odd hours. It is also used to generate the graph automatically by entering the time at different stations based on the section wise.

**Loco Inspector Movement:**
This module includes the complete movements of the loco inspectors according to section wise through online. This module also used to know the repair schedule of the loco.

## VI. CONCLUSION

The primary goal of this system is to enhance the systems capability to keep track of all the information which helps the management to know the current positions of the pilots by just glancing through the system generated details. It can relieve the loco pilots of their duty just by sending them an automatically generated message which saves both time and work.

This system has been able to successfully incorporate all the requirements as specified by the user considering every single quality factor. Appropriate care has to be taken during database design to maintain integrity and to avoid redundancy of data.

This system is designed in such a way that in which any further modifications needed, can be done easily. The front-end design was done in graphical user interface and can be easily interacted.

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