

WHAT IS IN TIME

P.K.MISHRA

AGM, SOUTH WESTERN RAILWAY

Time is a brisk wind, for each hour it brings something new... but who can understand and measure its sharp breath, its mystery and its design?

Standardisation of time has been a unique contribution of Railways in modern world.

The regions, which were majestically isolated earlier, lost their temporal identity after the advent of railways. Time was a local matter set to the position of sun and each town set its clock accordingly.

Railroads began to annihilate space and time by shrinking the travel time between cities from days or months to mere hours. However, these local times, which would change by one minute every twelve miles, became a scheduling nightmare due to multiplicity of time standards throughout the country. Railroad timetables in major cities listed dozens of different arrival and departure times for the same train, each linked to a different local time zone. Mistakes and errors were frequent and sometimes disastrous leading to frequent accidents.

As soon as more than one train needed to run over a single line of track, a means had to be developed to prevent collisions. A “time interval system” before the advent of modern communication network was developed . The rule was that a ruling train had right of one hour against the opposing train of the same class. As railroads grew bigger, the hour interval fell by the wayside, and shorter headways of 5 minutes became an industry wide practice in US.

Timetable operation required that all moving trains use a consistent standardized time and possible cumulative errors of clocks and watches involved in the movement of opposing trains would not exceed 3 minutes.

Railroad time was first introduced on the Great Western Railway in England in 1840, when a number of different local times were synchronised and a single standard time applied.

A **Standard Time System**, proposed by William F. Allen, established five equal time zones in the U.S. and Canada, each time zone exactly one hour ahead of the zone to its west, allowing the railroads to standardize railroad schedules. On October 11, 1883, the new Standard Time System was adopted, superseding some 49 operating times.

The railroads installed a **Standard Clock** in major stations. These were high quality pendulum regulators maintained to strict standards. In order to ensure these standard clocks were always correct, a **time signal** was transmitted by telegraph once every 24 hours, using the resources of the national observatory. The correction signal took the form of a string of dots at one second on, one second off intervals and was transmitted via Morse telegraphy for three minutes prior to the hour. This was followed by a 10 second silent period, then a dash at precisely 12:00 p.m. Station agents were thus given a way to spike (correctly set) the clocks at their location.

In the very early days of railways in India, local time was observed at each large city, in common with practice in most other countries at the time. Bombay and Poona, for instance, had their own local times differing by about 7 minutes. There were anomalies too, such as Ahmedabad which strangely observed Madras local time. Because of their importance as administrative as well as commercial and economic centres, Bombay Time and Calcutta Time assumed special importance and were followed for many official purposes in the late 19th century (Bombay Time from 1884), effectively forming two time zones for British India. Calcutta was the administrative capital of India until 1912. Calcutta Time was 5 hours, 30 minutes, and 21 seconds in advance of GMT, while Bombay Time was 4 hours and 51 minutes ahead of GMT. However, over time, many railway companies standardized on using Madras Time which was in between Bombay and Calcutta times, and often this, rather than Bombay time, was what was used in Indian timetables from the late 1880s onward, including the Newman's Indian Bradshaw, although this was far from universal. The East Indian Railway, for instance, for a long while used Jabalpur local time, 34 minutes and 6 seconds behind Calcutta Time. Madras Time, or 'Indian Standard Railway Time', or 'Railway Time' as it was often known, was 32 minutes and 49 seconds behind Calcutta Time, i.e., 4 hours 57 minutes and 32 seconds in advance of GMT. Madras Time was, by the late 19th century, effectively used for railway timetables over the whole subcontinent, across Lahore, Bombay, Calcutta, and Madras. Timetables for Bombay trains usually had the local times for trains printed

alongside the Madras Time schedule, and trains arrived and departed according to the Madras Time schedule.

Before standard time was implemented in the country, there were plethora of local timings ,

Excerpt from time table: Madras time which is 30 minutes in advance of Bombay ,10 minutes in advance of Agra , 13 minutes in advance of Delhi and 23-1/2 minutes in advance of Lahore time was kept at all stations on those lines.—Maclean guide 1889 page 429

Vide Circular No, R. T. 62, RAILWAY BOARD. Simla, the 1st June 1905, Government of India after consulting several railway companies introduced standard time which was exactly 5-1/2 hours in advance of GMT and 9 minutes in advance of Madras time and 5 minutes 23 seconds earlier than Rangoon time. These instructions came into force at midnight between 30th June and 1st July 1905. Necessary changes in GR were also made to replace Madras time with IST.

RESOLUTION:

The Government of India having decided, after consulting the several Railway Administrations, to introduce upon all railways (other than local disconnected lines where the change would be inconvenient) and in all telegraph offices, a Standard time which will in India be exactly 5-1/2 hours in advance of Greenwich and 9 minutes in advance of Madras time and in Burma 6-1/2 Hours ahead of Greenwich and 5 minutes 23 seconds earlier than present Rangoon time, the necessary instructions were issued to all Railway Administrations concerned to introduce the Standard time at midnight between the 30th June and the 1st July-1905, This has necessitated an amendment of rule 3 of Chapter III, Part I, General Rules for working open lines of railway in India, which prescribes the use of Madras time.—administration report 1905

Conductors and enginemen were always to compare their watches before starting on a run or before commencing work each day, other members of the train crew were to compare their watches with the conductor's or engineman's watch at the first opportunity.

The railroad industry was called upon to create standards for watches which all railroads would eventually follow. By 1893 the **General Railroad Timepiece Standards Commission** presented new guidelines, referred to as the **General Railroad Timepiece Standards**.

EIR entered an agreement with M/S John Walker , the legendary watch & clock maker of London and ordered the bulk requirements on them. The company proudly displayed its exclusive arrangement with EIR and advertisement by the company in London papers, which mentioned: “*By appointment to the East Indian Railways.*”

‘Lund and Blockley of Bombay had erected tower clock at kharagpur BNR workshop in 1904.

“Lund and Blockley's Turret Clocks. —Messrs. Lund and Blockley of Bombay, who are the makers of the Bombay University clock and chimes, and of the Calcutta G. P. O. clock, have just completed the erection of a tower clock showing the time on three dials 4 feet in diameter, and striking the hours on a bell of 5 cwt., at the new Workshops of the Bengal-Nagpur Railway at Khargpur, which the firm have been complimented upon.

They have also in hand a tower clock for the Post Office at Lahore with one dial 5 feet in diameter and striking on a 4 cwt. bell ; a larger clock with four dials 5 feet in diameter, and striking hours on 5 cwt. bell at Lyallpur ; and a still larger one for the New Town Hall at Indore, C. I., with four dials 10 feet in diameter, and striking hours and quarters on bells weighing 15 cwt. We need hardly say that the firm supply a distinct want in India in their own special line, and the long record of their undertakings —all over the country during the past three decades —proves that they have earned the fame associated with their name.”

----Indian engineering 1904

Preservation of vintage clocks has been done all over IR; one can find them working in different railway establishments: headquarters of Zonal Railways and Divisions. We were able to salvage and restore six such priceless heritage clocks in Asansol which were lying abandoned, scrapped for last five decades, taking total collection of such heritage clocks to twelve. These vintage clocks are now majestically ticking away in divisional meeting room, offices, institutes, DRM chamber and other prominent places proudly reminding the glorious past.

We have also launched a drive in SWR for tracing, cataloguing and preserving such priceless heritage relics and numbers of vintage clocks have been displayed in offices and museums after restoration

In order to ensure continuing accuracy and facilitate safe railroad operation almost all railroads required periodic **watch inspection** and time service rules

were issued which required constant checking, comparison with standard clock and confirmation. You can trust rail road companies to issue elaborate check sheets and schedule forms to make it fail safe.

Sample the guidelines:

it is suggested and recommended that employes when purchasing new watches for use in railroad service, should select 17 or 19 jeweled grades, which have steel escape wheels, sapphire pallets, double roller escapements, Breguet hairsprings, patent regulators, adjusted to temperature, isochronism and five positions. Besides the regular standard, 17 jewels, the 19 jeweled watches must have two bearings jeweled in the going parts of the mainspring barrel, to fill all the requirements.

In the care of the watch, the following points are important, especially in railroad service:

A. - The movement must be clean and the oil fresh. If the oil becomes “sticky” or “gummy” from any cause, it must be removed and fresh oil put on. Frequently fine watches, after being put in order and regulated, will begin to change their rate at the end of six or eight months, caused by the chemical changes taking place in the oil.

B. - Be careful to note that none of the pivots is running dry, especially the balance pivots, which require close attention, as their running dry causes irregular rating and injury to the pivots by their cutting from lack of oil.

C. - The hairspring is a very important item; it must be true, not warped or bent. The regulator pins should be straight so that the hairspring will strike flat and equal. The pins should not be too tight or too loose, but should be just close enough to allow a slight vibration of the hairspring between them; this vibration should allow a clear space to be seen (by the aid of the glass) between the hairspring and pins, and the vibration must be equal between the two pins. The regulation should stand as near the centre of the index as practical.

D. - The balance wheel must be true and perfectly poised—this should have constant attention, as the severe usage of railroad service may jar the balance out of poise or spring the pivots slightly-especially the heavy balances.

E. - The mainspring should be taken out every time the watch is cleaned, and tested to see if it fits the barrel properly, and if its movement is perfectly free and its strength fully developed to the end that the motion of the balance will

not “fall off” during the last half of the day. The mainspring must be free from gummy oil or rust spots, and slightly fresh oiled. But if found lacking in any of the above points, must be replaced by one of the best quality, as the finest watch made will not keep correct time having a cheap, poor mainspring.

F. The dial wheels must be free—care should be taken that they do not come in contact with the dial. The second-hand many set too close to the dial without being noticed. There must be no friction between the minute and the hour-hand, and the hour-hand must not come in contact with the dial at the hub.

G. The stem wind must be free and easily worked—not binding or “grinding” at any point. Lever set watches are considered safer and are recommended for railroad service.

A significant development in the 1940s, especially after 1947, was the use of radio by the government and by commercial concerns, to broadcast time signals for various purposes. In the second half of the 20th century, the use of the time signal at 1600 hours generally fell into disuse and stationmasters and other staff were generally free to set their clocks according to the widely available radio time signals from broadcast stations.

Today the use of radios, automatic block signals, and central computer tracking of trains has lessened the role of the railroad watch on many railroads, yet watch requirements still remain important to safe railroad operation.