NORMAL SPEED, HIGHER-SPEED, SEMI-HIGH SPEED and HIGH SPEED in INDIA

by Dr. F. Wingler

Excerpts from a letter send to an Indian Track Engineer of Southern Railways, April 2016

Gatimaan Express hauled by WAP-5 arrives 04th April 2016 at Agra

Dear Sir,

I guess in India the discussion will run high,

if it will be prudent to invest capital in new dedicated **HIGH-SPEED LINES** for 200-300 kmph,

which have to be build in Standard 1.435 m and not Indian Broad Gauge, since worldwide no specific High Speed Train Technology had yet been developed for the Indian or Iberian Broad Gauge,

- this is why Japan had to go for the new dedicated High-Speed Lines from Meter Gauge to Standard Gauge, and Spain had to go from their Iberian 1.677 m Broad Gauge to dedicated Standard Gauge High Speed tracks <

or if it will be more advisable to use the conventional infrastructure by investing in special prepared conventional ballasted up-speeded Broad Gauge Tracks for ***"SEMI-HIGH SPEED"*** up to max. 200 kmph, parallel to existing alignments, which could also be used by 110 kmph conventional coach trains.

Only to prepare an existing track for higher-speed like between Hazrad Nizamuddin and Agra Cant for the 160 kmph ***GATIMAAN*** Express will be not the final solution. To run a 160 kmph train on tracks, which are used also by other trains, which cannot run over 110 kmph because the elder Indian coaching stocks are commissioned only for 110 kmph, will slow down the other trains, which have to give way on sidings for ***"INDIA`s 160 kmph Dream"***.

INR has no **AUTOMATIC TRAIN PROTECTION SYSTEM (ATP**) like many other worldwide railways, which run trains faster than 120 kmph. For trains running faster than 160 kmph such protection systems will become mandatory.

It is a question, if the Indian Economy will be strong enough to finance and bring the return of investment with new very expensive to build dedicated **HIGH-SPEED LINES** and **HIGH-SPEED SERVICES**, which will run mostly in tunnels, over bridges and on elevated structures as ballast-less slab tracks???

For India I am much more in favour for **"SEMI-HIGH SPEED"** or **"HIGHER-SPEED"** up to 200 kmph on ballasted Broad Gauge Tracks of conventional track technology, than dreaming of **"HIGH-SPEED"** (over 200 kmph up to 300 kmph; latter will be definitively on dedicated Standard Gauge 1.435 m tracks and not on the Indian Broad Gauge tracks), which cannot be used by conventional BG trains.

So, in future India will have to learn what to do for a speed-up to 200 kmph on ballasted BG tracks of conventional track structures, and INR will have to prepare additional parallel up-speeded tracks on the existing lines/alignments for **"SEMI-HIGH SPEED**", which can be also used by max. 110 kmph trains, if there will be room.

In Central Europe we don't face such constraints, because all express train coach rolling stocks are usually commissioned to run 160 to 200 kmph.

For a Speed-Up Formation rehabilitation and ballast cleaning with heavy on-track machinery will be more and more asked also in India.

The new powerful locomotives with IGTB asynchronous AC propulsion (like the WAP-5 and the new to build locomotives for the dedicated Freight Corridors) will increase the problems with rail Head Checks (Contact Fatigue). Preventive and target profile rail grinding will be more asked also in India to face such ***"MODERN PROBLEMS CAUSED BY MODERRN AC LOCOMOTIVE PROPULSION"*** - see my comments in my elaboration: ***"INDIAN RAILWAY TRACKS"***.

In future MARK III ERC or LOGWELL-G will be not the right rail fastening for modern up-speeded tracks. This fastening is cheap, but by far not ***"FIT AND FORGET",*** and it needs a lot of handwork and permanent and steady attention. The solution for the future will come from the **PANDROL FAST CLIPS**. You can see now how in England and in several other countries the Fastclips are replacing the Pandrol right-handed "e" or left-handed PR 400 series clips.

For **HIGHER-SPEED** long milled rails, 120 to 300 m, and proper flash-butt welds will become essential.

Well bearing formations without longitudinal fluctuation of the **BEARING CAPACITY** will become essential. For 200 kmph long-wave undulations and fluctuations in the wavelength of 100 to 200 m have to be avoided. If you look for example on the new double track between ASIKERE and BIRUR or on the gauge converted line from MIRAJ to PANDAPUR, the new tracks have become like a ***"ROLLER COSTER LINE"***. For 100 kmph the long wave-length fluctuations might be tolerable but not for 200 kmph. There are severe shortcomings with the sub-soil and sub-grade. And I guess the same will happen to the duplicated tracks in Kerala from KANYANKULAM to KOTTAYAM and to ALLAPUZHA. Indian Track Engineers have to learn more about the stability and bearing capacity of SUB-SOIL, SUB-GRADE and FORMATION. A ***"FIDDLE"*** on the superstructure alone will not do any more.

The needed Track Quality can only be achieved nowadays by on-track machineries and not any more by hand. And **QUALITY IS NO LUXURY**- see preface. Of my book INDIAN RAILWAY TRACKS.

My slogan is:

"TO ACHIEVE QUALITY, LOW DETERIORATION RATES, OVERALL LOW LIFE CYCLE COSTS and LONGEVITY UNDER GIVEN TRAFFIC LOAD (Weight and Speed) HEAVY ON-TRACK MACHINERIES ARE ESSENTIAL"!!!

INR can learn a lot from BRITISH RAIL, which has in the past decades increased the speed on the conventional infrastructure of the West and East Coast as well as in the Midlands up to 200 kmph with conventional ballasted technology, rather than to go to go for HIGH-SPEED.

German Railway has now problems with their elder **HIGH-SPEED TRACKS**. On the ballasted 280 kmph Kassel-Hannover track the ballast stones disintegrated after 30 years, faster than expected, and have now to be completely exchanged by new ballast. On the ballast-less 310 kmph "RHEDA" track, Siegburg - Frankurt Flughafen, the rails and the pads got worn and had to be exchanged after 17 years, faster than expected, because this track with its DIRECT VOSSLOH SKL 15 Fastening is TOO STIFF. RHEDA tracks are perhaps cheaper to build but more difficult to repair. Better are modern Max BÖGL or PORR (ÖBB, Austria) Slab Tracks. I have incorporated more additional details of those tracks in my book-elaboration.

Hope I can bring some more quality on INDIAN RAILWAY TRACKS by my contribution and revision works on Mr. Mundrey`s drafts and a better understanding about the

need for

INITIAL HIGH TRACK QUALITY.

Yours sincerely

Frank Wingler