

Rail-Fastening Demands for Semi High-Speed Rail Roads

Demand for Attendance-free “fit-and-forget” Rail-Fastening on envisaged IR “Semi High-Speed” Routes – Pandrol Fast-Clip an advisable Solution

By Dr. Frank Wingler, February 2017

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On the IPWE International Seminar, held 12th & 13th January 2017 at Mumbai, a Technical Paper under the headline:

SEMI HIGH-SPEED TRAINS ON INDIAN RAILWAYS NETWORK – TRACK AND VEHICLE SIDE DEMANDS

had been presented by Mr. Hitesh Khanna & Anil Kumar from IRCON International Ltd.; see www.ipwe2017mumbai.in.

The presentation reveals in details **IRCON**'s experience with the SGEDT Project in Malaysia for a 160 kmph Meter Gauge Track and with the Coach side demands for Semi High-Speed. In this project the rails are fastened with Pandrol Fast-Clips (**Fig. 4**).

Since years I follow the wellbeing and the performance of IR, and I had the privilege to participate as a foreign delegate on several IPWE Seminars of the last years.

In Sri Lanka the author followed in details regularly in the last years the **IRCON** Southern Railway Line Rehabilitation Project: Galle - Matara and Kalutara-South – Galle; under Indian line of credit. The author had the privilege to be taken for several rounds on the Tamping Machines on the Galle-Matara as well on the Alutgama-Ambalangoda Sections.

IRCON's rehabilitation works with Indian Technology in Sri Lanka gave the author the chance to monitor nearly daily during frequent visits in Sri Lanka the behaviour of the “left-handed” **ERC MARK III Fastening** under running Traffic Load, laid on India manufactured **IRCON** as well **SLR** fabricated (Design from Australia) prestressed Concrete Sleepers.

During frequent train travels in India the author has observed each and everywhere loose or fallen-off **MARK III ERCs**, especially on the Mumbai-Network of Western and Central Railway.

Loose ERCs or ERCs, which lost their grip (clamping force), contribute the DERAILMENT PRONENESS of a Rail Track.

The RDSO designed left-handed **MARK III ERC** with an anti-clockwise spatial rod-bend (an Indian modification of the left-handed Pandrol 401-Series Clips) is compared with other world-wide used Rail-Fastenings

- see the Technical Railway Paper **RAIL FASTENING SYSTEMS** free for download on the website <http://www.drwingler.com> ;
- see also comment of S. Gopalkrishna in his Paper presented on the IPWE Seminar, held 12th&13th Januar at Mumbai, No 7, Session I on *Track Strength and Track Geometry Design Requirements if heavy Freight Traffic has to coexist with Semi High-Speed Passenger Traffic*, Paragraph 3.9.2.

far away from being **“fit-and-forget”**. Regularly attendance by patrolling key-men is needed to drive loosened or fallen-off Clips back into the tunnel of the shoulder plate/housing; **Fig. 1:**



Fig. 1: Patrolling Key-Man, endangered on his daily Duty

On the IRCON upgraded Coast Line in SRL constantly a patrolling key-man per jurisdiction is needed to fasten the loose or to insert the fallen-off **Mark III ERCs**.

A Foreman of SLR in charge of a coast line jurisdiction informed that the “right-handed” ERCs (**Fig. 3**) of a Pandrol e-Clip design with the clock-wise bend are sturdier and less prone to get loose or to fall off than the “left-handed” Indian **Mark III ERCs (Fig. 2)**:



Fig. 2: “Left-handed” MARK III ERC on Indian manufactured IRCON Sleeper

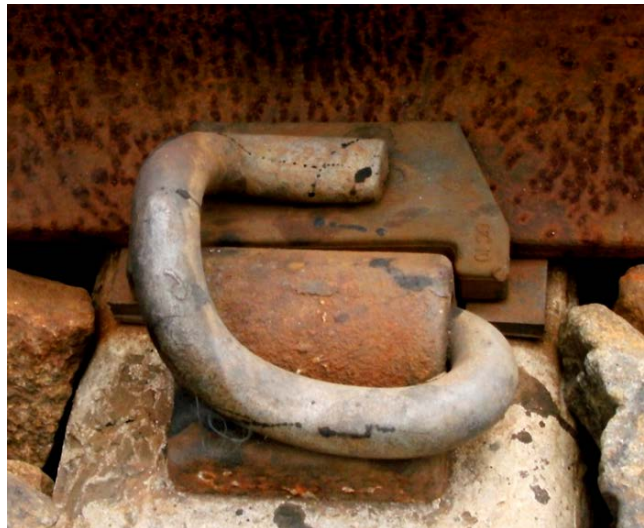


Fig. 3: “Right-handed” ERC on Indian manufactured IRCON Sleeper

160 kmph is a Standard Speed for scheduled Express-Trains on European Rail Road’s, and nobody speaks in Europe in context with 160 kmph about **“SEMI HIGH-SPEED”**. On such routes one cannot find any left-handed **MARK III ERC** evolved by RDSO. One cannot find any patrolling key-man with a hammer to drive loose or fallen-off ERCs back into the housing of a shoulder plate.

In the Technical Paper of Mr. Hitesh Khanna & Anil Kumar the advantage of the **“fit-and-forget”** Pandrol **Fast-Clip (Fig. 4)** installed on the new 160 kmph Meter Gauge Line build by **IRCON** under the SGEDT Project in Malaysia, is delineated.

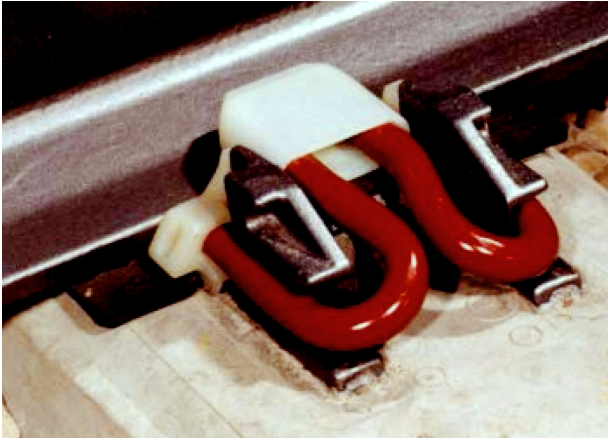


Fig. 4: Fast-Clip, SGET Project, Malaysia



Fig. 5: Pandrol Fast-Clip; Pandrol Rahee Technologies Pvt. Ltd.

Worldwide the Pandrol-Brand Fast-Clips are increasingly superseding the right-handed Pandrol Brand e-Clips. This Fast-Clip takes a trumped around the globe especially in England, Germany, France, Poland, Sweden, Estonia, Georgia, Lithuania, Russia, Serbia, Hungary, Corsica, Sri Lanka, Cambodia, Malaysia, Saudia Arabia, Australia, China and USA.

In England, wherever new sleepers get installed, the rails will be fastened by Fast-Clips. Even in Germany the motherland of direct Vossloh Screw/Tension-Clamp Fastenings, the Fast-Clips are nowadays installed on tracks with tight curvatures, where in 4-5 years interval due to high wear the high outer curve-rails have to be re-railed by robotic heavy-duty on-track machinery (River Rhine Valley Lines).



Fig. 6: Fast-Clips on Sri Lanka Railways; Steel-Sleeper and Clips from Pandrol Rahee Technologies Pvt. Ltd.

The Fast-Clip is nowadays the favourite Clip for new installed Steel-Sleepers, and it helped Steel Sleepers for a come-back in several European countries; f.i. in England, Corsica and in Sri Lanka; **Fig. 6:**

In his Paper No. 7, Session I, Mr. Gopalakrishnan reveals: “The Indian Mark III ERCs due to various reasons do not sustain designated toe load (clamping force), and it is high time to turn towards modern Fasteners”...” It can be stated, if someone develops a new fastener and if it passes through the tests successfully as prescribed in EN-13481 specification, the fastener is ready to be used on track”. The Pandrol Fast Clip is indeed in compliance with the European Norm EN 13481. PANDROL FAST-CLIP FE 1400 series fastenings are compliant with the requirements of EN 13481-2:2012 and the High Speed Interoperability Directive (TSI). PANDROL FAST-CLIP FE 1500 series fastenings are compliant with the requirements of EN 13481-8:2012 – Fastening systems for track with heavy axle-loads. Some configurations of Pandrol Fast-Clip FE 1400 and FE 1500 series fastenings are compliant with the requirements of AREMA Manual Chapter 30, Part 4.

The Fast-Clip Sleepers are delivered on site with all components held captive, and the clips with the toe-insulator are at parked position. Once the sleepers are placed and the rail has been threaded, the Fast-Clip is simply pushed from the parked to the installed position. The correct Clamping Force is achieved automatically.

The Fast-Clip is virtually maintenance free and a true ***“fit and forget”*** Rail-Fastening. Even under harsh conditions the Clip does not dislodge. No key-man is needed to push in regular intervals clips back, as it is needed for conventional parallel to the rail installed elastic Rail Clips, which can get loosened by rail-creep and vibration and corrosion/wear inside the housing-tunnel.

On an Indian 160 kmph Semi High-Speed Tracks there should be no necessity for a patrolling key-man endangered by the fast rail traffic as also J.S. **Mundrey** has revealed in his presented Paper No. 12 on the 2017 Mumbai IPWE Session II. Therefore, the indirect Indian ***“Indigenous Fastening System”*** for slab-tracks presented in Paper No. 32 by **Subodh Jain** and **Vipul Kumar** will have no future.



Fig. 7: “Indigenous indirect Fastening System”

The message is: IR, RDSO and IRCON should think about installing *“fit-and-forget”* Fast-Clips on IR-Routes envisaged for Semi High-Speed, when it comes to Sleeper Renewals.