The above headline is the motto of the independent British Rail Safety and Standards Board (RSSB) established to speed-up SAFETY in the system BRITISH RAIL; see: Interview with George Bearfield, Safety Director of Rail Safety and Standard Board, UK, in ETR, March 2016, No.3, eurailpress, Hamburg Germany, ISSN-0013 – 2845.


RSSB has published February 2016 a study on the HUMAN FACTOR leading to SIGNALS PASSED AT DANGER (SPAD); see: “Helping improve investigations into signals passed at danger (SPADs)”, www.rssb.co.uk. Despite there had been in GB no fatal accidents caused by Signals passed at Danger in the last years due to improved train control systems, there are still every year in GB about registered 300 SPAD cases – a hint that things do not work as planned.

In worldwide railways the contribution of the FACTOR HUMAN ERROR and HUMAN FALLIBILITY on unwanted bad Railway Events is still in the range of 30 to 40 %. The fundamental attribution ERROR is basic to the HUMAN ERROR. It should be the aim of all operators to reduce this contribution on the way of an overall reduction of accidents and near missed accidents for the ultimate goal to prevent Railway Accidents; see: Aryan Bhushan, M.M. Agarwal, INDIAN RAILWAY SAFETY – Ultimate Goal to prevent Railway Accidents, revised Edition 2015, Bahiri Brothers Publishers & Book Sellers, Delhi, 2015.

In early years under a prevailing so-called “PATHOLOGICAL SAFETY CULTURE” the so-called “PUNITIVE METHOD” had been in the foreground to “pin the culprits to be severely punished” or to blame “bad people” rather than the situation. Nowadays Safety Experts around the globe have understood, that the punitive method is a blunt weapon of nearly no effect on the way to improve the safety margin. It works even counterproductive. Such an approach leads, that people on all fronts will do everything to avoid detection of what really had happened. Failures in the System or latent unsafe Conditions with often far reaching history, the parents or breeding ground for accidents, are overlooked.

Since then a “NO BLAME CULTURE” had been established. Nobody should be discouraged to participate at the discovery, uncovering and detection and nobody should be discouraged to provide information.

Learning and taking lessons from own and others bad events are key instruments for improving Safety Records.
Discipline and adherence strictly to the safety rules and procedures has to be trained and constantly watched, monitored and controlled.

In collaboration of all ranks in a technical organization with a high risk potential one has to find out, what are the “HUMAN ERROR PRODUCING FACTORS”.

It is rare for Railway Accidents to result from a single error, almost always there will be a chain of contributing factors starting often from “LATENT UNSAFE CONDITIONS” and missed opportunities. Watching out for precursors of unwanted bad events (unsafe acts, unsafe conditions), sharing the details and learning from them can help to prevent the build-up of a chain of contributing factors, which might one day result in a real disaster; see: Christopher Jackson, editorial/comment in Railway Gazette International, March 2016, page 3, Sutton, GB.

A well functioning SAFETY INFORMATION SYSTEM under a so-called “GENERATIVE CULTURE”, where information are actively searched, messengers are trained and rewarded, responsibility is shared, failures lead to far reaching reforms and new ideas are welcomed, is an important error management tool.

A well functioning SAFETY INFORMATION SYSTEM depends on the willingness of individuals to report events in which they themselves may have played a significant part.

There is also an important lesson for those, who think that simply installing more advanced technology like Positive Train Control (PTC) or European Train Control System (ETCS) will eliminate all accidents. It won’t. Technical advances will undoubtedly continue to improve railway’s safety records. But they have to be considered and treated as a part of an overall risk reduction strategy, which embraces so much more.

James Reason quotes:

**EFFECTIVE SAFETY MANAGEMENT** is like a long-term fitness programme. Rather than struggling vainly to exercise direct control over incidents and accidents, managers should regularly measure and improve those processes

– design; hardware; constant and repeated teaching, training, education, coaching and examination especially of the so-called **“FRONTLINERS”** as there are: Train Drivers and their Assistants, Dispatchers and Control-Room (Movement Authority) Operators, Station Masters, Guards, Platform-Personnel; procedures, maintenance, planning, budgeting, communication, goal conflicts and the like –,

that are known to be implicated in the occurrence of accidents. These are the processes, which managers are hired to manage. In this way, safety management is not an add-on but an essential part of the system’s core business in order to navigate the organization of high risk potential towards an INCREASING RESISTANCE against hazards.

In recent times **Sri Lanka Railways** faced several fatal train crashes, several unwanted hazardous events and several near missed accidents, where **SPADs** had been obviously been involved.

The SLR Color Light Signaling is the most complex and complicated Signaling System around the globe with 55 valid Aspects. It does not know any automatic train protection system and no protection-overlap behind most of the main or stop signals. This system
separates trains from conflicting situations or hazardous arranged train movements only by "the thickness of one signal post". Overshooting of a Signal at Danger can lead to unwanted hazardous situations and even to accidents. This system does not use distinguished and marked Repeater Signals for Warning Aspects on sections of poor or hindered visibility. There are 22 different valid Warning Aspects with AMBER. SLR has no official comprehensive hand-book of their complex Color-Light Signaling for its “frontliners”. In addition train brake system are often not properly maintained, checked and tested leading sometimes to weak train brake-power or brake failures.

The author has discovered that several SLR train drivers are not any more afraid of Amber Aspects and take them not as serious and threatening as they should do. Some train drivers have the bad habit, before slowing down to come as near as possible to the next Signal on Danger in the expectation that the signal will turn to clear the moment when reached.

Railways all over the globe have experienced that the so-called “experienced train drivers with routine” are more likely to be entangled in an accident than less experienced. “Experienced” people are less afraid of “RISKY” and “TRICKY SITUATIONS”. Mostly such Signals are passed on danger, which usually show a clear aspect.

Routine has two sides. Most of serious mishaps in technical organizations (Railways) are caused not by beginners but by experts with many years of experience and routine. They are the operators who mostly infringe safety rules. By their routine they often forget to be afraid of risks. They have the fallacious and jugglery feeling that thanks their experience they cannot make a mistake.

There is no technology without mankind; therefore there exists also no technical failure without direct or indirect human influence or involvement.

The roots of failures are based on the functioning of PSYCHOLOGICAL MECHANISM. The functioning of our mind is determined predominantly by two processes, by “similarity matching” and “frequency gambling” (J. Reason).

If we have to decide between two different actions, we have the tendency to do things, that we did already in previous similar situations or under comparable circumstances.

This called “similarity matching”.

But if we cannot find in our mind a matching previous action, we will do, what had delivered us in the past mostly success.

This is called “frequency gambling”.

“Similarity matching” and “frequency gambling” support us to fulfill routine handlings. This helps us to agitate with prefabricated handlings or actions and makes for us the world easier.

“Similarity matching” and “frequency gambling” help in Sri Lanka the Loco Driver to digest and interpret the manifold and complex Color Light Signal Aspects with its manifold Color Light combinations, when he has to find to the right action within few seconds. This helps him to simplify the manifold information’s.

The way our brain works, when processing information’s on the way to an appropriate handling, is according the so-called “FUZZY LOGIC”. This is a natural methodology of our brain to sort out and handle imprecise or diffuse data to be used for problem solving. Fuzzy logic helps come to a precise output from imprecise inputs. Our brain works with such a process-control methodology. The method processes imprecise information’s or
only few information’s, processes those information’s with experiences of the past and thus comes to a tangible and precise output for process control.

The operator sticks to his experience and long-standing tradition. He will do automatically without many considerations, what he has done frequently earlier successfully without negative experiences or even punishment, even if his actions have violated safety rules. Failures can find their way into routine behaviors.

But there rests also a DANGER. A slight change in the circumstances or situation can thwart the success and turn the process towards a catastrophe. Experience and Routine based action, which went well in the past, may become the source for a hazard. This is a part of error causation in conjunction with cognitive psychological behavior. The danger is that faulty behaviors, which had previously no negative effect or result and which went on unpunished for a longer period, but made the world easier, will penetrate, loop, creep and worm into routine habits!

A faulty behaviour of Train Drivers (which got routine) is, not to be afraid any more of Amber Warning Aspects and not to take such aspects serious.

On invitation the author has given several seminars to SLR Train Drivers on the topic “Signaling and Human Error” and has given the following message:

Take Warning Aspects with Amber SERIOUS and slow down now and not “LATER” when reaching the next main signal. “LATER” may be too late.

The Starting point or birth-place of a SPAD is mostly the preceding Amber-Warnıng Signal, when not taken seriously.

The defense against SPADs is comprehensive teaching, training and coaching of Train Drivers to eliminate the “bad habits”, which have sometimes wormed into their mind under their daily routine.

Past experience from many countries suggests that out-of-course running can create a pressurized situation, where mistakes may be made. Therefore it is essential to train and prepare the “frontliners”, especially the train drivers, how to tackle safely with unexpected out-of-course running situations as well with so-called “tricky” and “risky” situations and sections with upmost vigilance.

Repeated Teaching, Education, Coaching, Training and Examination, especially of “frontliners”, are effective tools to minimize the contribution of the factor HUMAN ERROR and HUMAN FALIBILITY.