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The role of work stress in the development of accidents

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Introduction

People who are suffering from stress have lost control over their situation. They are less able to concentrate and more likely to make mistakes. Sometimes mistakes can lead to accidents. For those who suffer from it, stress can be seen as a disaster. For companies and for society it is a very serious problem.

Work related stress is a problem for management.

Therefore management need a tool to proactively manage stress. We at TNO Work and Employment have developed such a tool, at the request of Shell International. The tool is named Tripod Sigma.

In my presentation I'm going to concentrate on three points

1. Work related stress as compared to an accident
2. Work related stress as a problem for management
3. Tripod Sigma as a tool for management

I'd like to begin by explaining to you how stress can be compared to accidents.

Can you compare stress to disasters like the Brent Spar, the Herald of free enterprise or the Prestige? In a certain sense: yes. Stress has severe and dramatic consequences for individuals; it often means a financial disaster for companies and for society. Perhaps it is more diffuse and less spectacular, more insidious I would say.

Stress is a natural reaction for a person to threats in the situation. It is a physical, behavioural and emotional reaction that makes the person more alert to danger. This reaction is adequate for a certain period of time. But if this alertness is required very frequently and of long duration and there is not enough opportunity to rest, it may result in the feeling of having lost control over the situation and, in the long term, in illness.

To those who have seen colleagues or relatives suffering from stress or have experienced it themselves I need not tell you that this can easily be compared to a disaster on the micro level. People suffering from stress may lose their self confidence, cannot function normally either in their work or in their private life. They may experience symptoms such as severe depression, psycho-somatic disease, digestive problems and heart disease. People suffering from stress lose their 'Prestige' in their own eyes.

Let me now tell you something about the costs to society, of work related stress.

If you look at this table, you can see some figures of the costs related to work related psychological disorders in the Netherlands. For psychological disorders these costs are more than 5 thousand million Euros. That is slightly more than 1% of the GNP. The figures show that roughly 36% of the costs are related to stress.

Costs related to psychological disorder in the Netherlands

2001 in million euro's	Psychological disorders	All diagnosis
Absenteism	1444	3754
Disability	3309	9219
Medical care	276	833
	5029 (1.1% gnp)	13806

I wanted to present the same figures for Europe but these are not available. The comparison between the countries is difficult because of different systems of registering diagnosis for social benefits.

Now, what are the costs at company level? Well if you know the total costs of sickness leave, you can easily figure out within your company the costs of such absence caused by stress. 30 to 40% of the costs of absenteeism can be ascribed to stress.

But this is only the tip of the ice berg. More difficult to estimate is the loss of production from the fact that people working under stress don't perform well. They slow down; make mistakes that have to be rectified and - even worse - that may lead to accidents.

The main reason why Shell International asked TNO to develop a management tool for proactive stress management was that they have the clear impression that they don't get the best out of their workers, simply by pressuring them too much.

Now let's turn to the second point under discussion: work related stress is a problem for management. Normally stress is seen as a personal and medical problem.

Psychosocial problems need to be tackled by a psychiatrist. And yes, someone who suffers from psychological problems needs medical assistance. But it is a great mistake to think that providing medical aid is all that has to be done. If a member of your staff reports absent due to stress, you have to consider the question: what went wrong in the controlling of errors in our primary process and in our personnel management?

Let me illustrate this briefly with an example from a firm of consulting engineers. A young talented consultant - let me call him Jan, that's a very common name in Holland - suddenly calls his supervisor from home. Jan tells his supervisor that he can't come to work because he feels that he has totally lost

control over his work and in particular over the project he is responsible for. He is unable to concentrate on anything, can't sleep and feels very depressed.

His supervisor and colleagues were surprised because two days earlier they had worked very well with him, agreed upon actions to be taken and got on together as normal. The supervisor looked back and remembered that he had noticed that Jan worked very slowly over the last few months, that he made mistakes and that he tried to figure out everything in minute detail in his project. The supervisor had expressed his concern about the progress of the project to Jan and had himself carried out some of the necessary actions. Now the supervisor realised that Jan must have felt much pressurised and was exposed to very high demands.

The supervisor talked to the colleagues and found out that once or twice Jan had talked to them about a lack of clarity concerning who was responsible for what in his project. He learned that the information Jan needed to execute his project conform planning was delivered very late and was initially incomplete. The tasks were not properly co-ordinated between Jans department and the supplying department. Therefore Jan had to spend a lot of time for unplanned actions: discussing with colleagues from the supplying department that he needs the correct information on time. Jan must have felt that he had no authority to influence the work of these colleagues. The supervisor drew the conclusion that maybe related tasks were incorrectly allocated to different departments. Maybe these tasks needed to be combined to reduce complexity in the process. Furthermore he concluded that it was a mistake to make a young subordinate responsible for a project that requires the authority of a supervisor to realise it.

I had hoped that the supervisor had communicated these thoughts to Jan. Because that might help Jan to recover. But the supervisor did not do that because he was disappointed in Jan and have 'handed' him over to the personnel advisor and to the Health department.

But still this supervisor was on the right track. He was thinking back to the root causes of stress in the organisation. Actually he was carrying out a kind of Beta analysis on stress. I will return to this point later on.

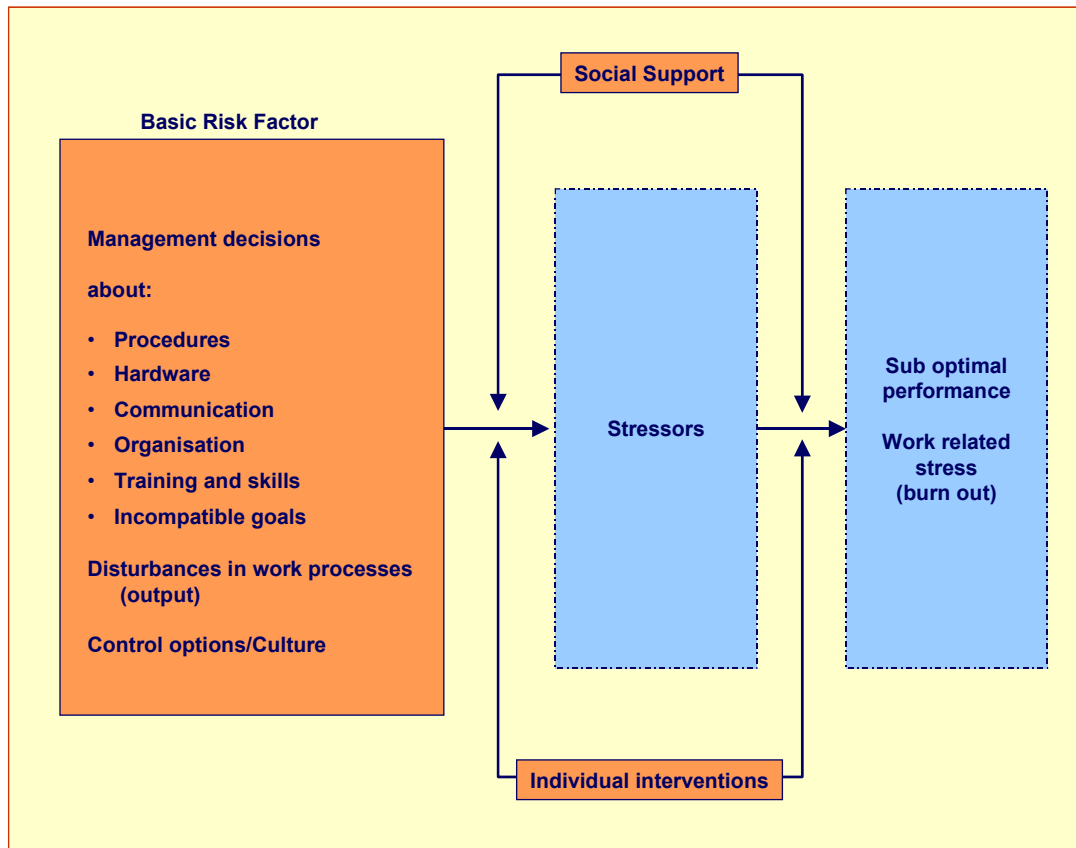
The example shows that root causes of work related stress can indeed be found in management decisions about organising the primary process and in the way responsibilities and authorities are allocated.

Having said this, the next step is easily made. If we knew what latent failures are in some basic risk factors in organisation and management, we could proactively look for them and improve them. You will by the way recognise the history of the development from Tripod Beta to Tripod Delta. Thus we could prevent the whole causal chain of events from happening.

Now this was the back ground that brought Shell International to TNO, through the agency of Jop Groeneweg, University of Leiden. The theory and instruments for stress prevention we at TNO had already developed fit very well to the Tripod philosophy.

I have come now to my third and last point, the presentation of the tool Tripod Sigma itself. Shell International was looking for a tool that can enable line managers to proactively manage the root causes of stress. This in order to reduce stress at work and to remove factors which prevent an optimal work performance.

The idea we came up with, together with Jop was that some of the Basic Risk Factors used in Tripod Delta to manage safety, might very well be considered as risk factors for stress as well. So we tested that idea in three pilots, in the shell companies: NAM, SEOP and SUKOP.

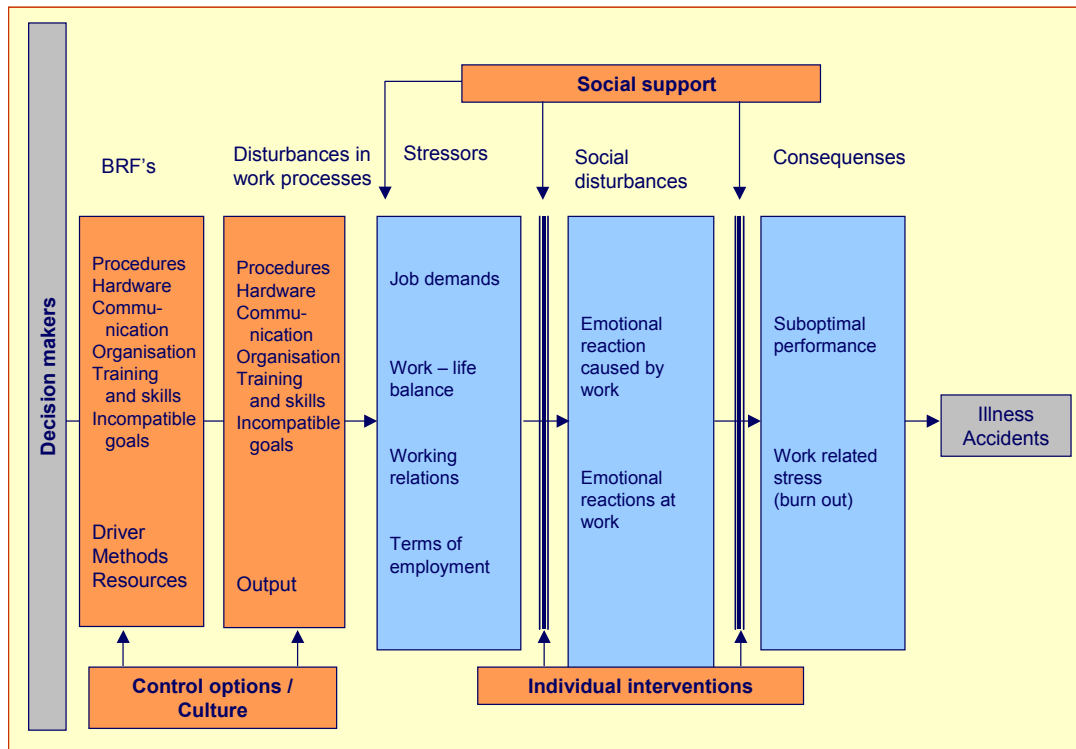


Let's take a look at this model. It illustrates what we have done to develop the tool.

On the left (orange) you see six BRF's out of the eleven of Tripod Delta. We considered these as probably relevant for work related stress. On the right side of the model you see the factors we used in our existing and validated instruments to measure stressors and consequences.

In the pilots, we tested whether the left side of the model is correlated to the right side. The idea is of course that if this is the case, than you may assume that improving the latent failures in the BRF's will diminish the chance that sub optimal performance and work related stress will occur.

The tests showed that - to scientific standards - there is a very good relation between the two parts. Thus for the management to know whether or not actions have to be taken to prevent stress, they only need to assess the six Basic Risk Factors.



This picture is an extension of the model I showed you just before. It shows the causation chain in total. Decisions of top management, the drivers in combination with decisions of middle management concerning resources and methods, may lead to disturbances in the primary process. For example mistakes that has to be corrected. Whether or not the person has the opportunity to control the situation makes a difference for his or her the evaluation of the situation as stressful. This also depends on the company culture.

Those disturbances (such as mistakes that have to be corrected) can be seen as stressors. The demands of the job increase or people have to take work home which disturbs their work-life balance. If this exposure to stressors continues for a longer period of time people have emotional reactions, they have the feeling of being pressurised. This can result in sub optimal performance and burn out and finally of course in illness and probably accidents. Social support by the supervisor and colleagues on the one side and individual interventions, such as stress courses on the other can influence this process in a positive way. Of these two, social support is more effective than individual interventions.

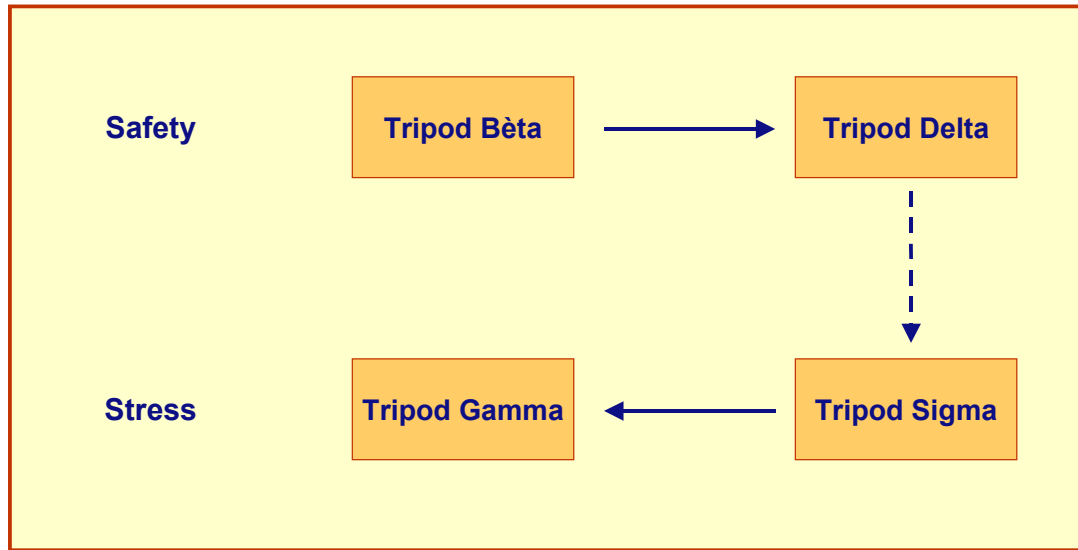
So now I am proud to say:

Tripod Sigma is

- . A reliable and valid tool for managing stress proactively,
- . It is an effective and efficient questionnaire
- . It leads management directly to the prioritising of their actions.

Before I come to my conclusion, I would like to come back to one point. Giving you the example of the engineer consultant Jan, I said that the supervisor had started to think about stress in a way that is analogous to Tripod Beta for safety. We have already made a start working out this idea; it fits very well in the Tripod philosophy.

Therefore I would like to put forward the idea of making a Beta like instrument for stress. Perhaps we can call it Tripod Gamma.



To summarise
Work related stress is a problem for management
Tripod Sigma is an appropriate tool for this management task
The development of a Tripod gamma might be worthwhile.