

International Conference on Probabilistic Safety Assessment and Management

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Keynote Speech by Prof. Dr. Dr. h.c. mult. Gisbert Frhr. zu Putlitz, Gottlieb Daimler und Karl Benz-Stiftung, Ladenburg

Dear Mrs. Spitzer, dear Mr. Schmocker, dear Colleagues, Ladies and Gentlemen!

I am very pleased and honoured to have the opportunity to address you with a keynote on the occasion of the opening of this prestigious conference.

As an experimental physicist working with accelerators the prevention of risks and the consideration of safety was a frequent companion in my own professional life. But of course, experiments in basic research are unique, are guided and observed by very professional safety teams. As a consequence casualties are very rare.

This situation changes drastically if risk affected systems become abundant like e.g. power generators (conventional and nuclear), air planes, fast travelling trains, or large chemical plants where a failure leads to mass destruction and many casualties. In other fields there may exist in the beginning often undetectable or unobservable risks introduced e.g. by genetically modified bioorganisms or insufficiently tested pharmaceuticals (Contergan). So risk is quite frequent in our life.

Risk prevention by professional risk assessment and management is above all an intellectual challenge. A detailed understanding of often complex technological systems is an indispensable prerequisite for the modelling of failure and disaster. Very powerful computers

play an important role in premodelling. Experience shows that even in areas and systems where only virtual instead of real experiments can be made in order to verify the models, the safety of technological systems has proven to be reliable. Hence it is justified to assume that safety management based on a rigid risk assessment and system analysis is technologically achievable, reliable and adequate.

At the end of the risk chain humans and the human factor play a key role in the success for the whole system. The only serious accident in nuclear power plants with major emission of radioactive material, i.e. Chernobyl, was caused by human misjudgement and incompetence. The most recent midair collision at the Lake Bodensee would have been avoided if both pilots would have followed only their collision warning and advice systems. Quite often the little signs at the beginning of the disaster are not taken seriously like some irregularities at the wheels of the intercity express disaster in Eschede or the little chunks of concrete falling down from the concrete roof at Charles de Gaulle airport some days prior to its collapse. In all these examples, which are numerous, the human factor has played a key role. From these accidents one can learn that more knowledge, more training, more alertness, more counter action against the danger of routines and more supervision have to be provided or introduced to humans being responsible for control. The control of humans by humans and the frequent upgrade of knowledge as well as simulation of dangerous situations to be mastered by humans is the modern answer to these problems not only by the airline industry in flight simulators but also in many other technology areas.

The most recent development in security research suggests that one could utilize methods that measure and qualify the security of team activity. Risk assessment and safety management should utilize the knowledge in fields like psychology and psycho-linguistics as well as group behavioural training, realistic simulation procedures and critical case studies. A human safety

culture has to be developed that utilizes the great competence humans can acquire but also consider and correct deficiencies introduced by the human factor. Areas where such human safety culture has to be developed are much more numerous than one may assume: the operation room of a hospital, the console of an engineer driving a high speed train, the operator supervising a nuclear power plant, the pilots of an airliner, or the astronauts in a space craft are all subject to the same problems and rules.

Let me also remind you that accidents, even catastrophes with the loss of many lives has not only human tragedy in it but may result also in large economical implications. Airplane crashes, the Eschede accident, or the Exxon Valdes havarie are causing losses of billions of dollars. Thus, investments in safety pay off at the end. This message has to be sent to those in politics and in the public sector responsible for the rules and support of security measures. And one other aspect should be pointed out as well: basic and applied research should be pushed ahead vigorously and should find prime support.

Recently, the Daimler Benz Foundation has supported a study where the problem of communication in a team was investigated in the areas mentioned above. The study under the title "Group interaction in high risk environments" was led by Professor Rainer Dietrich, a psycho-linguist, who will speak to you in an invited lecture on Wednesday morning. The concluding conference of this study over five years was held just a month ago at the Center for Global Dialog of the Swiss Re-Insurance Company in Rüsclikon. The title of this meeting stands for its result: "The better the team, the safer the world". I hope that the work in your International and European Associations you are representing at this conference will make the world safer. I wish you a very successful conference.