

Title	Study on health and safety aspects of working time
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Brief Introduction	<p>1 Introduction</p> <p>On 2005-03-23 at 01:20 pm an explosion occurred at the BP refinery at Texas City, USA, resulting in 180 injured and 15 killed persons, and financial losses exceeding 1.5 billion US \$. The responsible board operator had been working for 29 consecutive 12 h shifts, without any day off. The US Chemical Safety and Hazard Investigation Board (2007), which analyzed the accident, came to the conclusion that “fatigue was a likely contributing factor”.</p> <p>This does not seem to be an exception but rather the rule in such accidents. Reviewing some disastrous accidents from 1976 (Seveso) until 2010 (Deepwater horizon) (see Table 1) shows that in most of these cases one or even several characteristics related to the arrangement of working hours can be found which may have contributed to the impaired performance of the operators; e.g. working at unusual hours (nights, shifts), working long hours (12h shifts), postponing rest periods (up to 37 shifts in a sequence), or using shift systems which violate ergonomic recommendations (e.g. Wedderburn, 1991).</p> <p>Although such single events do not prove anything at all, it seems remarkable that the arrangement of working hours in the BP refinery case is an expedient illustration of at least two of the central problems in the organization of working hours addressed in the working time directive (WTD): working long hours, e.g. 12 h shifts, thus reducing the daily rest period and time for recuperation, and postponing weekly rest periods – although the working hours in this case would not have been covered by the WTD. The case clearly illustrates that long hours and insufficient rest can contribute substantially to the safety of operators, the plant and its environment, as well as the general public. Although it is no proof this case nicely demonstrates the findings of our review on the effects of the organization of working time on health and safety.</p>