World Academy of Science, Engineering and Technology
International Journal of Environmental and Ecological Engineering
Vol:12, No:03, 2018

Human Factors Integration of Chemical, Biological, Radiological and Nuclear Response: Systems and Technologies

Authors : Graham Hancox, Saydia Razak, Sue Hignett, Jo Barnes, Jyri Silmari, Florian Kading

Abstract : In the event of a Chemical, Biological, Radiological and Nuclear (CBRN) incident rapidly gaining, situational awareness is of paramount importance and advanced technologies have an important role to play in improving detection, identification, monitoring (DIM) and patient tracking. Understanding how these advanced technologies can fit into current response systems is essential to ensure they are optimally designed, usable and meet end-users' needs. For this reason, Human Factors (Ergonomics) methods have been used within an EU Horizon 2020 project (TOXI-Triage) to firstly describe (map) the hierarchical structure in a CBRN response with adapted Accident Map (AcciMap) methodology. Secondly, Hierarchical Task Analysis (HTA) has been used to describe and review the sequence of steps (sub-tasks) in a CBRN scenario response as a task system. HTA methodology was then used to map one advanced technology, 'Tag and Trace', which tags an element (people, sample and equipment) with a Near Field Communication (NFC) chip in the Hot Zone to allow tracing of (monitoring), for example casualty progress through the response. This HTA mapping of the Tag and Trace system showed how the provider envisaged the technology being used, allowing for review and fit with the current CBRN response systems. These methodologies have been found to be very effective in promoting and supporting a dialogue between end-users and technology providers. The Human Factors methods have given clear diagrammatic (visual) representations of how providers see their technology being used and how end users would actually use it in the field; allowing for a more user centered approach to the design process. For CBRN events usability is critical as sub-optimum design of technology could add to a responders' workload in what is already a chaotic, ambiguous and safety critical environment.

Keywords : AcciMap, CBRN, ergonomics, hierarchical task analysis, human factors
Conference Title : ICDEM 2018 : International Conference on Disaster and Emergency Management
Conference Location : London, United Kingdom
Conference Dates : March 15-16, 2018