Unintended Vulnerabilities and Uncertainties in Emergency Medical Ambulance

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Many important engineering applications are influenced by wide range of untended vulnerabilities and uncertainties. The impact of this influence is complex nonlinear phenomena, operational breakdowns, and eventually shortening the stability, reliability and safety lifetime of the systems. Standard patient diagnoses, care and medical treatment in emergency medical ambulances are impacted by vulnerabilities and uncertainties induced by road vibration, response time and human factor development index. Several studies associated with emergency medical ambulance modernization have indicated a greater need for the elimination of vulnerabilities and uncertainties from the work of EMTs. In this presentation, we will locate and interpret the levels of vulnerabilities and uncertainties that emergency medical rescue vehicles can withstand so as to maintain quality patient centric care. We will present models with vulnerabilities and uncertainties for ambulance rescue vehicles, and study them in infinite dimensional function spaces. In the function spaces, we will show the regimes of stable, reliable and safe EMT work. The range of the vehicle parameters and dynamics most susceptible to unintended vulnerabilities and uncertainties will be established. For each range of the vehicle parameters, we will locate ambulatory working patterns, response time, human factor development index and road vibration frequencies that are pronoun to induce adverse vulnerabilities and uncertainties. Variable diffusion delays are typically the feedback controllers that will ensue that the system parameters subject to vulnerabilities and uncertainties can still attain regimes of stability, reliability and safety at wide range of frequencies. The variable diffusion delays are the stochastic resonances of the characteristics of the stiffness and damping in the system. They are controller functions with regulatory nonlinear phenomena and probabilistic processes that can influence the energy induced by the momentum of vulnerabilities and uncertainties in the system. Finally it will be shown how the ambulatory patterns, response time, and improved human development index and vibration suppression method with acceptable vulnerabilities and uncertainties can enhance the quality of ambulance ride and patient centric care.