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Comparative Study of Non-Identical Firearms with Priority to Repair Subject to Inspection

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Abstract : The purpose of this paper is to develop and analyze two reliability models for a system of non-identical firearms – one is standard firearm (called as original unit) and the other is a country-made firearm (called as duplicate /substandard unit). There is a single server who comes immediately to do inspection and repair whenever needed. On the failure of standard firearm, the server inspects the operative country-made firearm to see whether the unit is capable of performing the desired function well or not. If country-made firearm is not capable to do so, the operation of the system is stopped and server starts repair of the standard firearms immediately. However, no inspection is done at the failure of the country-made firearm as the country-made firearm alone is capable of performing the given task well. In model I, priority to repair the standard firearm is given in case system fails completely and country-made firearm is already under repair, whereas in model II there is no such priority. The failure and repair times of each unit are assumed to be independent and uncorrelated random variables. The distributions of failure time of the units are taken as negative exponential while that of repair and inspection times are general. By using semi-Markov process and regenerative point technique some econo-reliability measures are obtained. Graphs are plotted to compare the MTSF (mean time to system failure), availability and profit of the models for a particular case.

Keywords : non-identical firearms, inspection, priority to repair, semi-Markov process, regenerative point
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