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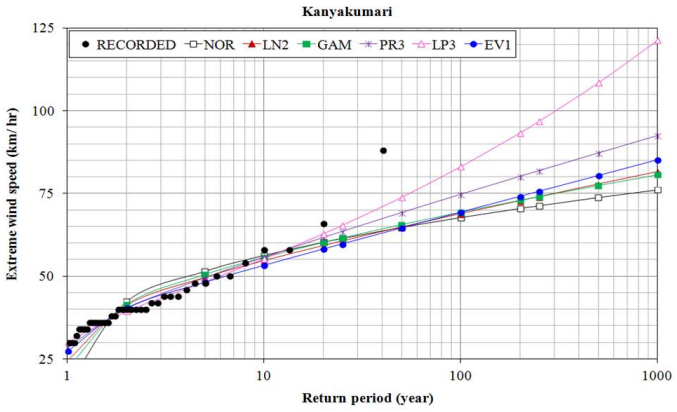


Figure 1. Plots of recorded and estimated EWS for different return periods by six PDs for Delhi and Kanyakumari

Research Paper

Extreme Value Analysis of Wind Speed Data using Maximum Likelihood Method of Six Probability Distributions.

Vivekanandan N.

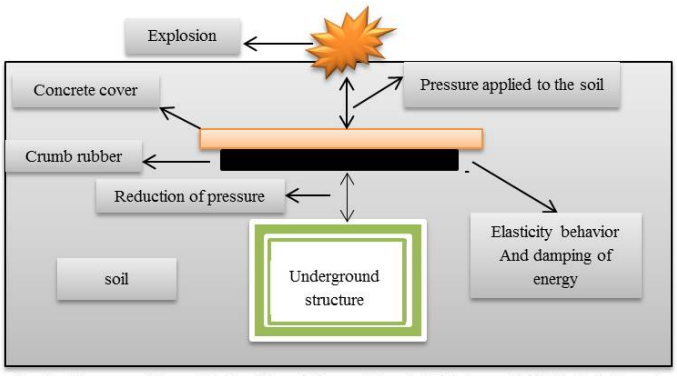
J. Civil Eng. Urban., 8(2): 12-16, 2018; pii:S2252043018000003-8

Abstract

Assessment of wind speed at a region is a pre-requisite while designing tall structures viz.

cooling towers, stacks, transmission line towers, etc. This can be achieved through Extreme Value Analysis (EVA) by fitting of probability distributions to the annual series of extreme wind speed (EWS) data that is derived from hourly maximum wind speed. This paper details the study on EVA of wind speed data recorded at India Meteorological Department Observatories of Delhi and Kanyakumari adopting six probability distributions such as Normal, Log Normal, Gamma, Pearson Type-3, Log Pearson Type-3 (LP3) and Extreme Value Type-1. Maximum likelihood method is applied for determination of parameters of the distributions. The adequacy of fitting of probability distributions to the series of recorded EWS data is evaluated by Goodness-of-Fit tests viz., Anderson-Darling and Kolmogorov-Smirnov and diagnostic test using D-index. Based on GoF and diagnostic tests results, the study suggests the LP3 distribution is better suited amongst six probability distributions adopted for EVA of wind speed data for Delhi ad Kanyakumari.
Keywords: Anderson-Darling test, D-index, Kolmogorov-Smirnov test, Log Pearson Type-3, Maximum likelihood method, Wind speed

[Full text- PDF] [HTML] [XML] [MOBI] [ePUB] [AZW3]



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Research Paper

Reduction of Damage of Buried Ammunition Depots in the Ground by Crumb Rubber Cement against Explosion Force.

Mirzaee M, Vaezi M and Mamandi S and Abdolrahman O.

J. Civil Eng. Urban., 8(2): 17-24, 2018; pii:S225204301800004-8

Abstract
Nowadays, due to the development of missiles with high power of destruction and accuracy as well as the increase in terrorist attacks, it is better to keep military equipment in the depth of the ground. Using the underground structures (US) has been interested in shelters and ammunition depots for many years. But these structures should also be resistant to surface explosions. For this purpose, the structure must be constructed at high depths or the structure protected by the specific coating. The aim of this study was introduced and evaluates the performance of a combined coating containing crumb rubber cement (CRC) to prevent the transmission of compression waves. Hence, to check the effectiveness of this coating by modeling a buried structure in ANSYS LS-DYNA at a depth of 5 meters from the ground surface and placing crumb rubber cement CRC at a depth of 2 meters from the ground surface and above the structure, the model was subjected to an explosion equivalent to 100 kilograms of TNT was analyzed for 25 milliseconds. The results showed that by inserting crumb rubber cement CRC, because of high elasticity with large deformations of crumb rubber (CR), adding it into concrete can absorb energy and reduce its transfer to the Layers down, and therefore lead to a reduction in the amount of failure and pressure which applies to the structure. To investigating the effect of the thickness of the CR layer, the pressure, and failure rate of the structure was analyzed for 0.1, 0.2, 0.3, 0.4, 0.5 m thickness layers. The results indicated that by increasing the thickness of the CR from 0.1 m to 0.5 m, the pressure and failure rate is reduced. But the intensity of this decrease of 0.4 meters later is very low so that it can be ignored. It is concluded that, CR with a thickness of 0.4m with concrete cover can be considered as a recommended optimal design and an applicable strategy in the construction of buried structures on the ground against the explosion forces.
Keywords: Ammunition depots, Crumb rubber, Concrete cover, Explosion, TNT

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