

عنوان مقاله:

Probabilistic holistic seismic risk evaluation methodology for port structures

محل انتشار:

نهمین همایش بین المللی مهندسی سواحل، بنادر و سازه های دریایی (سال: 1391)

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خلاصه مقاله:

Seaports are the cornerstone of international trade and have become increasingly important as the trend for globalized production and distribution of goods has grown stronger. Seaports are also an important part of transportation networks because they function both as sources and sinks for the freight traffic that flows through the transportation infrastructure of a country. In the past, ports have suffered serious damages from earthquakes because their location near estuaries and river deltas and their construction on landfills has made them particularly susceptible to liquefaction and ground failure. Damage to port structures that reduces their functionality will limit the port's operational capacity and result not only in monetary losses attributed to the repair and replacement cost of the structures, but will also result in revenue losses due to reduced throughput. The operational capacity of a maritime port after an earthquake is of great concern to the port authority and tenants because port revenues and market share retention depend largely on the continuing operation of the berthing facilities. Moreover, freight movement through the port is important for the local industries and factories. For many regions, a capacity reduction in the port system results in severe economic consequences. Two recent events demonstrate that an earthquake can severely affect port operations. After the 1989 Loma Prieta, California, earthquake, one of the 8 container terminals of the Port of Oakland sustained heavy damage and had to cease shipping operations completely. It took almost six months to fully restore operations while the repairs continued. Eventually, the port estimates it spent \$14 million (in 1989 dollars) and it took 23 months to inspect, analyze, design, bid, and reconstruct 922m of damaged wharf in that terminal [7]. Fortunately, the ship traffic could be diverted to other operating terminals, so no loss of operating revenues was reported. After the Great Hanshin earthquake in Kobe, Japan in 1995, the direct repair cost incurred by the port of Kobe was estimated to be (in 1995 dollars) \$5.5 billion and the economic impacts on port dependent industries due to the loss of operations at the port were estimated to be about \$6 billion [28]. During the earthquake, the port lost about 80% of its operating capacity due to extensive wharf damage. It was reported [9] that the Port of Kobe had only recovered 80.4% of its monthly amount of exports and imports as compared to before the earthquake. This permanent ... loss of business occurred even though the port had recovered 75% of it

کلمات کلیدی:

seismic risk, direct loss, indirect economic impacts, port, probability

