

## Marine Port Guidance and Best Practices for the International Community

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**Keywords: Hazard Assessment, Tsunami Modeling, Response, Mitigation**

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### GENERAL:

#### General Countries

American Society of Civil Engineers. (2020). ASCE Library. Retrieved from <https://ascelibrary.org>. Summary: Search tool to find latest information on engineering maritime research in a specified country. Keywords: Hazard Assessment, Response, Mitigation

US National Tsunami Hazard Mitigation Program. (2020). National Tsunami Hazard Mitigation Program Publications and Resources. Retrieved from <https://nws.weather.gov/nthmp/publications.html> Summary: Links to latest information from the National Tsunami Hazard Mitigation Program. Keywords: Tsunami Modeling, Response, Mitigation

MarComWorkingGroup112. (2010). MarCom WG 112: Mitigation of Tsunami Disasters in Ports (2010). Retrieved from <https://www.pianc.org/publications/marcom/mitigation-of-tsunami-disasters-in-ports> Summary: Port damage from tsunamis in Japan, United States, Mexico, Indonesia, Sri Lanka, Thailand, Turkey, and Greece. Keywords: Hazard Assessment

Kong, L. (2018). *Preparedness for Maritime Community Tsunami Planning for Ports and Harbours USA and Japan Examples*. Retrieved from [https://drive.google.com/file/d/1gFBOF7NsG9V9kpXP\\_Q4SPUum5-6DoKK1/view?usp=sharing](https://drive.google.com/file/d/1gFBOF7NsG9V9kpXP_Q4SPUum5-6DoKK1/view?usp=sharing) Summary: Establishing thresholds for Hawaii and Guam, evacuation plans and protocols, and awareness. Keywords: Mitigation

## **PACIFIC:**

### **CHILE**

American Society of Civil Engineers. Earthquake Investigations, C. (2013). *Chile earthquake of 2010 lifeline performance*. Reston, Va: American Society of Civil Engineers. Summary: Chapter 4 “Ports” gives an overview of Chilean port performance following a tsunami from the Chile earthquake of 2010. Keywords: Hazard Assessment

MinistryofPublicWorksPortWorksDepartment. (2020). Featured Information. Retrieved from <http://www.dop.cl/Paginas/default.aspx> Summary: Homepage with links to seminar reports and interactive maps of fishing coves and maritime infrastructure. Keywords: Hazard Assessment, Mitigation

### **JAPAN**

Technical Council on Lifeline Earthquake Engineering. (2017). *Tohoku, Japan, Earthquake and Tsunami of 2011*. Summary: Damage observations in Port of Sendai, Shiogama, Otsuchi, Kamaishi, and Kesenuma. Keywords: Hazard Assessment

Muhari, A., Charvet, I., Tsuyoshi, F., Suppasri, A., & Imamura, F. (2015). Assessment of tsunami hazards in ports and their impact on marine vessels derived from tsunami models and the observed damage data. *Natural Hazards*, 78(2), 1309-1328. doi:10.1007/s11069-015-1772-0 Summary: Numerical modeling of the southern part of Honshu Island and a developed loss function for marine vessels. Keywords: Tsunami Modeling

Suppasri, A., Muhari, A., Futami, T., Imamura, F., & Shuto, N. (2014). Loss Functions for Small Marine Vessels Based on Survey Data and Numerical Simulation of the 2011 Great East Japan Tsunami. *Journal of Waterway, Port, Coastal, and Ocean Engineering*, 140(5), 04014018. doi:10.1061/(ASCE)WW.1943-5460.0000244 Summary: The results of study and loss functions may be used for macroscale tsunami hazard and loss predictions with small marine vessels. Keyword: Tsunami Modeling

Imai, K., Inazumi, T., Emoto, K., Horie, T., Suzuki, A., Kudo, K., . . . Sasaki, T. (2019). Tsunami Vulnerability Criteria for Fishery Port Facilities in Japan. *Geosciences*, 9(10), 410. doi:10.3390/geosciences9100410 Summary: Develops a method to assess probabilistic tsunami damage at fishery ports such as Nachi Katsu'ura in Wakayama Prefecture. Keywords: Tsunami Modeling

Suppasri, A., Nguyen, D., Abe, Y., Yasuda, M., Fukutani, Y., Imamura, F., & Shuto, N. (2015). *Offshore evacuation of fishing boats - Lessons from the 2011 Great East Japan tsunami and its future challenge*. Retrieved from [http://www.tsunami.civil.tohoku.ac.jp/hokusai3/J/publications/pdf2/vol.32\\_6.pdf](http://www.tsunami.civil.tohoku.ac.jp/hokusai3/J/publications/pdf2/vol.32_6.pdf)

Summary: Interviews on fishermen's evacuation response during 2011 Great East Japan Earthquake and its relationship to site geography. Keywords: Response

Hayashi, M., Nakada, S., Abe, T., & Kobayashi, E.-i. (2016). *Influence of Eddies on Vessel Evacuation from Tsunami*. Paper presented at the The 26th International Ocean and Polar Engineering Conference, Rhodes, Greece. <https://www.onepetro.org/conference-paper/ISOPE-I-16-226> Summary: Examines properties of eddies in the Port of Sakai Senboku from the Nankai Trough Earthquake. Keyword: Tsunami Modeling

良典, 嶋, 隆範, 北, 毅, 多, & 宏, 八. (2017). *Proposal and application of Tokyo Bay Ship Evacuation Risk Maps during a Tsunami*. Paper presented at the JSCE Proceedings B2 (Coastal Engineering) Vol. 73, No. 2, I\_415-I\_420. Summary: A tsunami risk map for vessel evacuation using numerical simulation in Tokyo Bay, Port of Yokosuka. Keywords: Tsunami Modeling

Abe, K., Takano, S.-e., & Kato, H. (2018). Actual Situations and Problems of Fishing Boats Evacuation in Iwate Prefecture at the time of Tohoku Pacific Ocean off Earthquake. *Fisheries Engineering*, 55, 95-103. Retrieved from [https://www.jstage.jst.go.jp/article/fisheng/55/2/55\\_95/\\_pdf](https://www.jstage.jst.go.jp/article/fisheng/55/2/55_95/_pdf) Summary: Authors explain issues with offshore evacuation based on questionnaires and interviews with fishermen. Keywords: Hazard Assessment

Katada, T., Murasawa, N., & Kanai, M. (2012). Inspection of the rule development effect about Fishing-Boat Evacuation against Tsunami. *Disaster Information*. Retrieved from <http://www.katada-lab.jp/doc/p123.pdf> Summary: Table 1 in the top-right of page 2 is a guideline for offshore evacuation for fishing boats. The first column is warning level, second is expected tsunami height, third is suggested sea depth as target for evacuation, and fourth is the required time for evacuation (should not do offshore evacuation if less time than this). Keywords: Tsunami modeling

Ministry of Land, Infrastructure and Transport Harbor Bureau. (2013). Guidelines on Harbor Tsunami Evacuation Countermeasures. Retrieved from [https://drive.google.com/drive/folders/1yd8jzCv\\_IHvuCuUvXXkZ7i2j-Du7uYha](https://drive.google.com/drive/folders/1yd8jzCv_IHvuCuUvXXkZ7i2j-Du7uYha) Summary: Table of contents created from Google Translate by ITIC, Feb 2018. Keywords: Mitigation

Fisheries Infrastructure Department, Fisheries Agency, Ministry of Agriculture, Forestry and Fisheries, Japan, IOC Tsunami Unit Translation and support from Japan Meteorological Agency 2007. (2008). Japan Tsunami Response Fishing Ports and Harbors. Retrieved from <https://drive.google.com/drive/folders/183RRxXhoU2DmbyqKO6WSyskfSSPLQkBn>

Maritime Bureau. Organization and Functions of the Maritime Bureau (May 2014). Retrieved from [https://drive.google.com/drive/folders/1jCZOZAgiC4FAG5mDqZ5rBPFMGj\\_33hND](https://drive.google.com/drive/folders/1jCZOZAgiC4FAG5mDqZ5rBPFMGj_33hND)

Kahoku Online News. (2019). Part 9: Preparations in the Workplace (1) Putting Out to Sea / Wall of Water, Risking Lives to Tak. Retrieved from [https://drive.google.com/drive/folders/1jCZOZAgIC4FAG5mDqZ5rBPFMGj\\_33hND](https://drive.google.com/drive/folders/1jCZOZAgIC4FAG5mDqZ5rBPFMGj_33hND)

Ministry of Land, Infrastructure, Transport and Tourism Maritime Bureau. (Mar 2014). Guide for Creating Tsunami Evacuation Manuals for Ship Operators. [https://drive.google.com/drive/folders/1jCZOZAgIC4FAG5mDqZ5rBPFMGj\\_33hND](https://drive.google.com/drive/folders/1jCZOZAgIC4FAG5mDqZ5rBPFMGj_33hND)

Ports and Harbors Bureau. Ministry of Land, Infrastructure, Transport and Tourism. (2013). Guidelines for Tsunami Evacuation Measures at Ports. Retrieved from <https://www.mlit.go.jp/common/001014485.pdf#search='%E6%B8%AF%E6%B9%BE%E3%81%AE%E6%B4%A5%E6%B3%A2%E9%81%BF%E9%9B%A3%E5%AF%BE%E7%AD%96%E3%81%AB%E9%96%A2%E3%81%99%E3%82%8B%E3%82%AC%E3%82%A4%E3%83%89%E3%83%A9%E3%82%A4%E3%83%B3'>. Summary: How to react to the harbor manager during a tsunami. Keywords: Response.

Maritime Bureau, Ministry of Land, Infrastructure, Transport and Tourism. (2014). Guidance for Creating a Tsunami Evacuation Manual for Ship Operators. Retrieved from <https://www.mlit.go.jp/common/001274513.pdf#search='%E8%88%B9%E8%88%B6%E9%81%8B%E8%88%AA%E4%BA%8B%E6%A5%AD%E8%80%85%E3%81%AB%E3%81%8A%E3%81%91%E3%82%8B%E6%B4%A5%E6%B3%A2%E9%81%BF%E9%9B%A3%E3%83%9E%E3%83%8B%E3%83%A5%E3%82%A2%E3%83%AB'>. Summary: How to react to the ship captain during a tsunami. Keywords: Response.

Ministry of Land, Infrastructure, Transport and Tourism. (2005). Ports and Harbors anti-earthquake measures. Retrieved from [https://www.mlit.go.jp/english/2006/k\\_port\\_and\\_harbors\\_bureau/07\\_earthquake/index.html](https://www.mlit.go.jp/english/2006/k_port_and_harbors_bureau/07_earthquake/index.html). Summary: Policies to protect Japan's marine transport network and improves local disaster prevention capabilities, especially during a local tsunami. Keywords: Mitigation.

Japan Association of Marine Safety, Japan Maritime Center. (2015). Research on Navigation Safety Measures in the Event of Major Earthquake/Tsunami Strikes. Final Report (Excerpt). Summary: Foreign seafarers may refer to this report to learn guidance for tsunami safety measures in a port, and safety/disaster prevention measures for large vessels carrying dangerous cargo. Keywords: Response.

Maritime Bureau. (2014). Organization and Functions of the Maritime Bureau. English. Summary: Outlines the Maritime Bureau key roles and divisions and defines the Maritime Bureau functions. Keywords: Mitigation.

Japan Maritime Center. (2015). Japan Maritime Center. English. Summary: Introduces the Japan Maritime Center, organization, mission, and project support program. Keywords: Mitigation.

Japanese:

<http://www.mlit.go.jp/common/001018329.pdf>

<http://www.mlit.go.jp/common/001014485.pdf>

[http://www.mlit.go.jp/kowan/kowan\\_tk1\\_000029.html](http://www.mlit.go.jp/kowan/kowan_tk1_000029.html)

<http://www.mlit.go.jp/common/001020131.pdf>

[http://www.fdma.go.jp/neuter/about/shingi\\_kento/h24/tsunami\\_hinan/01/sanko\\_10.pdf](http://www.fdma.go.jp/neuter/about/shingi_kento/h24/tsunami_hinan/01/sanko_10.pdf)

[http://www.mlit.go.jp/river/pamphlet\\_jirei/kaigan/gaiyou/panf/station/hokkai.pdf](http://www.mlit.go.jp/river/pamphlet_jirei/kaigan/gaiyou/panf/station/hokkai.pdf)

[http://www.mlit.go.jp/river/pamphlet\\_jirei/kaigan/gaiyou/panf/station/shizu.pdf](http://www.mlit.go.jp/river/pamphlet_jirei/kaigan/gaiyou/panf/station/shizu.pdf)

Japan Harbor Manual. (2016). Maritime Bureau. Retrieved from

<https://drive.google.com/drive/folders/1E6poUZGSz-8YAN6nYt7rOA4OwOJEoMah>

- Checklist
- Flow Chart
- Cargo Ship
- Passenger Ship

Policy Change Conference. (Date). Recent Policy Changes Regarding Tsunami Disaster Countermeasures. Retrieved from <https://drive.google.com/drive/folders/1E6poUZGSz-8YAN6nYt7rOA4OwOJEoMah>

Tsunami Protection Committee. (2005). Recommendations of the Tsunami Protection Committee, English. Retrieved from <https://drive.google.com/drive/folders/1E6poUZGSz-8YAN6nYt7rOA4OwOJEoMah>

Tsunami Protection Committee. (2005). Recommendations of the Tsunami Protection Committee, Spanish. Retrieved from <https://drive.google.com/drive/folders/1E6poUZGSz-8YAN6nYt7rOA4OwOJEoMah>

Fire and Disaster Management Agency. (June 2014). The Countermeasure of Ship for Tsunami Forecast, English. Retrieved from <https://drive.google.com/drive/folders/141cZBwtq7qM37i7EskrCiPDZP15IFul> FDMA created a new rule to save firefighters in a tsunami event. However, the table is useful for small boat owners, vessel and medium-sized vessels docked at the pier, and vessels and small boats for navigating. Keywords: Response.

Fire and Disaster Management Agency. (June 2014). The Countermeasure of Ship for Tsunami Forecast, Japanese. Retrieved from <https://drive.google.com/drive/folders/141cZBwtq7qM37i7EskrCiPDZP15IFul>

Japan Institute of Navigation. (2013). Great East Japan Earthquake Study Group. Retrieved from <https://drive.google.com/drive/folders/141cZBwtq7qM37i7EskrCiPDZP15IFul> Summary: Recommendations and proposals from disasters in ships and ports, and tsunami response procedure. Keywords: Mitigation.

Akakura, Y., & Ono, K. (2017). Estimation Method for Port Cargo Demands After Large-Scale Earthquakes and Tsunamis. *Journal of JSCE* Vol. 5, page 113 – 122. Retrieved from <https://drive.google.com/drive/folders/1dpJiAydu30KMeY3KkComXIyxFDAamn3H>

Ono, K., Benevente, C.F., Akakura, Y. (2015). Analysis Supporting Tools for Developing Business Continuity Plan. Kyoto University Research Information Repository. Retrieved from <https://drive.google.com/drive/folders/1dpJiAydu30KMeY3KkComXIyxFDAamn3H>

Arikawa, T. (2018). Improvement of Prevention and Response Capability against Tsunami. Seminar at the National Singapore University, 19<sup>th</sup> January 2018, Singapore. Retrieved from <https://drive.google.com/drive/folders/14rXOoxoFYfwom7WE07Yf0QuCD3uJXBBp>

## **New Zealand**

Borrero, J. C., Goring, D. G., Greer, S. D., & Power, W. L. (2015). Far-Field Tsunami Hazard in New Zealand Ports. *Pure and Applied Geophysics*, 172(3), 731-756. doi:10.1007/s00024-014-0987-4 Summary: Numerical modeling study for Marsden Point, Tauranga Harbor, Port Taranaki, and Lyttelton Harbor. Keywords: Tsunami Modeling

LEARNZ. (2020). Tsunami Hazard in New Zealand. Retrieved from <http://www.learnz.org.nz/geohazards152/bg-standard-f/tsunami-hazard-in-new-zealand> Summary: Instructions for a locally and distantly generated tsunami for the New Zealand maritime community. Keywords: Response

Ragued, B., Wotherspoon, L. M., & Ingha, J. M. (2013). A Review of New Zealand Port Infrastructure and Their Vulnerability to Natural Hazards. Retrieved from <https://aes.org.au/wp-content/uploads/2013/11/43-RAGUED-Bilel.pdf> Summary: Initial study on characteristics of New Zealand port infrastructure and vulnerability to tsunami hazards. Keywords: Tsunami Modeling

## **USA**

US National Tsunami Hazard Mitigation Program. (2015). *Guidelines and Best Practices for Tsunami Hazard Analysis, Planning, and Preparedness for Maritime Communities Version 5 (7-12-15)*. Retrieved from [http://www.ioc-tsunami.org/index.php?option=com\\_oe&task=viewDocumentRecord&docID=18495](http://www.ioc-tsunami.org/index.php?option=com_oe&task=viewDocumentRecord&docID=18495) Summary: Addresses minimum requirements to develop consistent and reliable tsunami preparedness products for maritime communities. Keywords: Mitigation

US National Tsunami Hazard Mitigation Program. (2012). Proceedings and Results of the 2011 NTHMP Model Benchmarking Workshop. Boulder: U.S. Department of Commerce/ National Oceanic and Atmospheric Administration / US National Tsunami Hazard Mitigation Program; (NOAA Special Report). 436 p. Retrieved from <https://nws.weather.gov/nthmp/documents/nthmpWorkshopProcMerged.pdf> Summary: Numerical models verified and benchmarked to determine tsunami inundation and run-up. Keywords: Hazard Assessment

US National Tsunami Hazard Mitigation Program Mapping and Modeling Subcommittee. (2015). Workshop: Tsunami Currents Meeting Notes. Retrieved from <https://nws.weather.gov/nthmp/documents/NTHMPBenchmarkingWorkshop2015.pdf> Summary: Currents benchmarking workshop addresses adequacy of tsunami models to capture current velocities. Keywords: Hazard Assessment

National Oceanic and Atmospheric Administration / National Centers for Environmental Information. (2020). Retrieved from <https://www.ngdc.noaa.gov> Summary: Historical tsunami database on past tsunamis that show if, where, and how much damage occurred in a specific maritime community. Includes documents, personal accounts, videos. Keywords: Hazard Assessment

Woods Hole Oceanographic Institution. (2020). Acoustic Doppler Current Profiler. Retrieved from <https://www.whoi.edu/what-we-do/explore/instruments/instruments-sensors-samplers/acoustic-doppler-current-profiler-adcp/> Summary: Background information on current velocity instruments such as Acoustic Doppler Current Profiler (ADCP). Keywords: Hazard Assessment

US National Tsunami Hazard Mitigation Program. (2015). Development of "MES Guideline for Maritime Tsunami Mapping". Retrieved from <https://nws.weather.gov/nthmp/2015annualmeeting/MaritimeMappingMES.pdf> Summary: Potential maritime map products and guidelines for developing consistent products across states and territories. Keywords: Hazard Assessment

Lynett, P. J., Borrero, J., Son, S., Wilson, R., & Miller, K. (2014). Assessment of the tsunami-induced current hazard, *Geophys. Res. Lett.* 41, 2048-2055. doi:10.1002/2013GL058680 Summary: Approach to interpret measured tsunami-induced current impacts and a validation approach for simulation tools. Keywords: Hazard Assessment

US National Tsunami Hazard Mitigation Program. (2016). Update on NTHMP Maritime Preparedness and Response. Meeting. Retrieved from <https://nws.weather.gov/nthmp/2016annualmeeting/Maritime.pdf> Summary: NTHMP Strategic Plan, new MMS/NTHMP Maritime Guidance document, current benchmark workshop and report, and an update on NOAA states/territories/commonwealths are working on to address maritime issues. Keywords: Hazard Assessment

Wilson, R., Lynett, P., Miller, K., Admire, A., Ayca, A., Curtis, E., . . . Peterson, D. (2016). *Maritime Tsunami Response Playbooks: Background Information and Guidance for*

*Response and Hazard Mitigation Use*. Retrieved from California Department of Conservation California Geological Survey: Summary: Example of a tsunami response playbook. Keywords: Hazard Assessment

Wilson, R., & Miller, K. (2014). *Tsunami Emergency Response Playbooks and FASTER Tsunami Height Calculation: Background Information and Guidance for Use*. Retrieved from California Department of Conservation California Geological Survey: Summary: Tsunami evacuation playbooks, FASTER tsunami height calculation, and example and guidance for use. Keywords: Hazard Assessment

US National Tsunami Hazard Mitigation Program. (2020). National Tsunami Hazard Mitigation Program. Retrieved from <https://nws.weather.gov/nthmp/> Summary: Maritime guidance homepage with links to state or territory websites for USA. Keywords: Mitigation

US National Tsunami Hazard Mitigation Program, & US Coast Guard. (2017). Guidance for Safe Minimum Offshore Depth for Vessel Movement for Tsunamis. Retrieved from <https://nws.weather.gov/nthmp/documents/GuidanceforSafeMinimumOffshoreDepthforVesselMovement.pdf> Summary: Table 1 shows minimum offshore safe depths for maritime vessel evacuation prior to arrival of a tsunami for states/territories in a distant source tsunami, local source tsunami, with updated notes. Keywords: Response

**TABLE 1: Specific regional guidance for minimum offshore safe depths for maritime vessel evacuation prior to the arrival of tsunami.**

State/Territory	Distant Source (ships in harbor)*	Local Source (ships at sea)*	Notes on this Update
California	30 fathoms	100 fathoms	Evaluated; evaluating potential safe areas within large bays and ports
Oregon	30 fathoms	100 fathoms	Evaluated; also evaluating Columbia River
Alaska	30 fathoms	100 fathoms	Evaluated; ships should be at least 1/2 mile from shore for all scenarios
Washington	30 fathoms	100 fathoms	Evaluated; evaluating special conditions exist inside Puget Sound
Hawaii	50 fathoms	50 fathoms	Evaluated; implemented in Coast Guard response plans at some locations
American Samoa	50 fathoms	50 fathoms	Evaluating, guidance from others
Puerto Rico	50 fathoms	100 fathoms	Evaluated
USVI	50 fathoms	100 fathoms	Evaluating; possibly follow PR
Guam	50 fathoms	100 fathoms	Coordinated with USCG Guam Sector
CNMI	50 fathoms	100 fathoms	Coordinated with USCG Guam Sector
Gulf Coast States		100 fathoms	Evaluating; issues with long, shallow shelf complicate getting beyond safe depth
East Coast States		100 fathoms	Evaluating; issues with long, shallow shelf complicate getting beyond safe depth

\* Ships also recommended to be a minimum of ½ mile from shore or fringing reef

National Oceanic and Atmospheric Administration / National Weather Service. (2020). Tsunami Warning System Exercise. Retrieved from <https://www.tsunami.gov/?page=exercises> Summary: Website with links to exercise manuals and resources for planning. Keywords: Response

Southern California Earthquake Center. (2020). TsunamiZone. Retrieved from <https://www.tsunamizone.org> Summary: Website with links to “Tsunami Walk How-To Guide” and “Register your Tsunami Preparedness Activities.” TsunamiZone.org has links to know your zone and register tsunami preparedness activities. Keywords: Response

TsunamiZone. (2019). Maritime Tsunami Preparedness. Video. Retrieved from <https://youtu.be/v6s7QYgqY0g> Summary: YouTube video on how to prepare for a tsunami if at port or operating a vessel. Keywords: Response

American Society of Civil Engineers / Coasts, Oceans, Ports, and Rivers Institute. (2015). Waterfront Facilities Inspection and Assessment. doi: 10.1061/9780784413579. Summary: Provides Engineers with guidelines and methods to inspect and evaluate waterfront structures. Keywords: Mitigation

Gaythwaite, J. W. (2016). General Design Considerations. In *Design of Marine Facilities* (pp. 57-125). Summary: General considerations for maritime facility planning, design, and construction. Keywords: Hazard Assessment

Keen, A. S., Lynett, P. J., Eskijian, M. L., Ayca, A., & Wilson, R. (2017). Monte Carlo-Based Approach to Estimating Fragility Curves of Floating Docks for Small Craft Marinas. *Journal of Waterway, Port, Coastal, and Ocean Engineering*, 143(4), 04017004. doi:doi:10.1061/(ASCE)WW.1943-5460.0000385 Summary: Evaluates if a floating dock will survive a specified tsunami scenario. Keywords: Hazard Assessment

Wilson, R., Richards, K., & Miller, K. (2017). 2017 Update on NTHMP Maritime Preparedness, Response, Mitigation, and Recovery Planning. Summary: Updates for maritime planning, NTHMP Strategic Plan measures, and MMS/NTHMP Maritime Guidance/Best Practices document, draft on NTHMP Guidance for USCG for minimum safe offshore depth for vessel movement, current benchmark workshop report, and NTHMP partner states/territories/commonweaths. Keywords: Hazard Assessment, Tsunami Modeling, Mitigation, Response

## **USA – California**

California Governor's Office of Emergency Services, & Humboldt. (2020). How Should Boat Owners Prepare for Tsunami. Retrieved from <https://www.conservation.ca.gov/cgs/Documents/Tsunami/Tsunamis-What-boaters-should-know.pdf>. Summary: Vessel Owners and Boating Community. How should boat owners prepare for a tsunami. Keywords: Response

California Geological Survey, California Governor's Office of Emergency Services, US National Tsunami Hazard and Mitigation Program, National Oceanic and Atmospheric Administration (2020). Can my boat outrun a tsunami? Retrieved from <https://www.conservation.ca.gov/cgs/Documents/Tsunami/Can-my-boat-outrun-a-tsunami.pdf> Summary: Poster explaining if your boat can outrun a tsunami. An example map of maximum water currents in port of Los Angeles and Long Beach is provided. Keywords: Response

California Geological Survey, California Governor's Office of Emergency Services, US National Tsunami Hazard and Mitigation Program, & National Oceanic and Atmospheric Administration. (2020). Can I surf a Tsunami? Retrieved from

<https://www.conservation.ca.gov/cgs/PublishingImages/Tsunami/Can-I-surf-a-tsunami-poster.jpg> Summary: Poster explaining why you cannot surf a tsunami. Keywords: Mitigation

National Weather Service Eureka. (2013). Fisherman Describes Attempt To Outrun Tsunami - Crescent City, CA. Summary: A fisherman shares experience escaping Crescent City harbor after 2011 tsunami. Keywords: Response

*California State Hazard Mitigation Plan Chapter 7 - Flood Hazards: Risks and Mitigation.* (2018). Retrieved from [https://cityofwatsonville.org/DocumentCenter/View/12472/010-2018-SHMP\\_FINAL\\_Ch-7](https://cityofwatsonville.org/DocumentCenter/View/12472/010-2018-SHMP_FINAL_Ch-7) Summary: Additional tsunami hazard mitigation material from City of Watsonville. Keywords: Response

California Tsunami Policy Working Group. (2014). *California's Tsunami Risk A Call for Action.* Retrieved from California Tsunami Policy Working Group: [https://www.wsspc.org/wp-content/uploads/2014/03/TPWG-Report\\_Final\\_032314.pdf](https://www.wsspc.org/wp-content/uploads/2014/03/TPWG-Report_Final_032314.pdf) Summary: Provides recommendations to prepare maritime community for tsunami hazards. Keywords: Mitigation

One San Francisco. (2019). *City and County of San Francisco Hazards and Climate Resilience Plan.* Retrieved from [https://onesanfrancisco.org/sites/default/files/inline-files/HCR%20Full%20Report\\_0.pdf](https://onesanfrancisco.org/sites/default/files/inline-files/HCR%20Full%20Report_0.pdf) Summary: Shoreline mitigation strategies to protect maritime assets in the Port of San Francisco from a tsunami. Keywords: Mitigation

Sweeney, B., & Becker, A. (2020). Considering Future Sea Level Change in Maritime Infrastructure Design: A Survey of US Engineers. *Waterway, Port, Coastal, and Ocean Engineering*, 146(4). Retrieved from <https://ascelibrary.org/doi/pdf/10.1061/%28ASCE%29WW.1943-5460.0000583> Summary: Survey of United States engineers view and method for maritime infrastructure projects affected by sea level change. Keywords: Mitigation

UpCodes. (2016). California Code of Regulations, Title 24, Part 2, Chapter 31F, "Marine Oil Terminals". Retrieved from <https://up.codes/viewer/california/ca-building-code-2016/chapter/31F/slc-marine-oil-terminals#31F> Summary: Building code criteria for marine oil terminals in California. Keywords: Hazard Assessment

Heffron, R. (2019). New PIANC Guidelines for Oil and Gas Marine Terminal Design and Assessment. 15<sup>th</sup> Triennial International Conference. In *Ports 2019* (pp. 535-542). Summary: Global guideline to design and assess marine oil and gas terminals. Keyword: Hazard Assessment

California Governor's Office of Emergency Services. (2020). Debris Management. Retrieved from <https://www.caloes.ca.gov/cal-oes-divisions/recovery/disaster-mitigation-technical->

support/technical-assistance/debris-management Summary: Debris Management Guidance for California. Keywords: Mitigation

Lynett, P., Borrero, J., Wilson, R., Miller, K., & Son, S. (2013). Detailed Simulation of Tsunami-Induced Currents in California Ports and Harbors. In *Ports 2013* (pp. 550-559). Summary: Study focuses on how ports and harbors are affected by tsunami-induced currents. Keywords: Tsunami Modeling

US National Tsunami Hazard Mitigation Program. (2018). Tsunami Mitigation Strategies for Harbors. Summary: 2018 updates tsunami mitigation strategies, response planning, and recovery planning for harbors. Keywords: Hazard Assessment

California Geological Survey, University of Southern California, California State Lands Commission, & California Governor's Office of Emergency Services. (2017). *Harbor Improvement Report No. 2017-SD-01 Oceanside and Camp Pendleton Harbors – San Diego County*. Retrieved from <https://drive.google.com/file/d/10tKO3I-4Aua2Ne-iPIFAh8Z2-ZHkxolx/view?usp=sharing> Summary: Maritime Tsunami and Coastal Mitigation Guidance for Harbor Engineers and Emergency Managers. Keywords: Mitigation

California Geological Survey, University of Southern California, California State Lands Commission, California Governor's Office of Emergency Services. (2017). *Harbor Improvement Report No. 2017-DN-01 Crescent City Harbor - Del Norte County*. Retrieved from <https://drive.google.com/file/d/1mt-Ozx64Pnilf0ityeifVEVaS1doG22n/view?usp=sharing> Summary: Maritime Tsunami and Coastal Mitigation Guidance for Harbor Engineers and Emergency Managers. Keywords: Mitigation

California Department of Conservation. (2020). *Tsunamis*. Retrieved from [https://www.conservation.ca.gov/cgs/Documents/Tsunami/TsunamiHazardMitigationActivities\\_inCalifornia.pdf](https://www.conservation.ca.gov/cgs/Documents/Tsunami/TsunamiHazardMitigationActivities_inCalifornia.pdf) Summary: Links for tsunami maritime preparedness documents in California. Keywords: Mitigation, Response

<https://www.conservation.ca.gov/cgs/Documents/Tsunami/Tsunamis-What-boaters-should-know.pdf>

[https://filerequest.conservation.ca.gov/?q=CGS\\_SR241.pdf](https://filerequest.conservation.ca.gov/?q=CGS_SR241.pdf)

<https://www.conservation.ca.gov/cgs/Documents/Tsunami/TsunamiMaritimePlaybook-Ventura.pdf>

[https://www.conservation.ca.gov/cgs/Documents/Tsunami/TsunamiHazardMitigationActivities\\_inCalifornia.pdf](https://www.conservation.ca.gov/cgs/Documents/Tsunami/TsunamiHazardMitigationActivities_inCalifornia.pdf)

Wilson, R. I., Admire, A. R., Borrero, J. C., Dengler, L. A., Legg, M. R., Lynett, P., McCrink, P., et. al. (2012). Observations and Impacts from the 2010 Chilean and 2011 Japanese Tsunamis in California (USA). *Pure and Applied Geophysics*. doi:10.1007/s00024-012-0527-z Summary: Contains a map of California with locations of interest from the 2010 and 2011 tsunamis, tables of forecasted and observed tsunami arrival times and amplitudes, with summaries of damage, tsunami flow maps and still images of Crescent City Harbor and Santa Cruz Harbor, and a NOAA marigram. Keywords: Hazard Assessment, Tsunami Modeling

### **USA – Hawaii, Guam, American Samoa**

Cheung, K. F. (2018). *Tsunami Modeling for Apra Harbor, Guam*. Retrieved from <https://drive.google.com/file/d/1f4PpOh9Yr8NzwhYcq2XTdyD3kJQir0lx/view?usp=sharing> Summary: Maritime hazard mapping in Hawaii and American Samoa, modeling strategy for Guam, model setup validation, sample data products for Apra Harbor, and input from the maritime community. Keywords: Hazard Assessment, Tsunami Modeling

Cheung, K. F., Yamazaki, Y., Bai, Y., & Li, L. (2018). *Modeling and Mapping of Tsunami Hazards for Maritime Communities in US Pacific Islands*. Paper presented at the UNESCO IOC Symposium: Advances in Tsunami Warning to Enhance Community Responses, Paris, France, 12-14 February 2018. Summary: Maritime hazard maps for American Samoa, Guam, and Hawaii with data products for US Coast Guard District 14. Keywords: Tsunami Modeling

### **USA – Hawaii**

Department of Land and Natural Resources / Division of Boating and Ocean Recreation. (2013). *Tsunami Emergency Plan*. Retrieved from <https://files.hawaii.gov/dlnr/dobor/contacts/Plan-TSUNAMI.pdf> Summary: Maritime preparedness planning for Hawaii boaters. Keywords: Response, Mitigation

TetraTech. (2018). *Draft State of Hawaii Hazard Mitigation Plan*. Retrieved from Hawaii Emergency Management Agency: <https://dod.hawaii.gov/hiema/files/2018/06/Draft-2018-State-of-Hawai'i-Hazard-Mitigation-Plan.pdf> Summary: Overview of 2018 HMP update, planning process, state profile, risk assessment, capability assessment, mitigation strategy, and maintenance plan. Keywords: Mitigation

Hawai‘I State Civil Defense. (2013). *Hawai‘i Boater’s Hurricane and Tsunami Safety Manual*. Retrieved from <https://nws.weather.gov/nthmp/2014mesmms/HawaiiBoaters.pdf> Summary: Tsunami emergency plan for boat owners. Keywords: Response

### **USA – Oregon**

Oregon Department of Geology and Mineral Industries. (2020). *Tsunami! What Oregon Boat Owners Need to Know*. Retrieved from <https://www.oregongeology.org/pubs/tsubrochures/>

Summary: Vessel Owners and Boating Community. What Oregon Boat Owners Need to Know.  
Keywords: Response

Oregon Department of Geology and Mineral Industries. (2020). Tsunami Awareness for Boaters, Fishermen & Mariners. Retrieved from <https://www.oregongeology.org/tsuclearinghouse/maritime.htm> Summary: Homepage for updated links to Oregon maritime guidance. Keywords: Response

## **USA – Puerto Rico**

Puerto Rico Seismic Network. (2019). Tsunami Preparedness Guide Maritime and Port Community of Puerto Rico. Spanish. Summary: Guide and recommendations to prepare tsunami response plans for the maritime community and port operators in Puerto Rico. Keywords: Response

NSF/PRSN/NOAA-NWS. (2010). *Tsunami Guideline Plan for Operators of Caribbean Ports*. Paper presented at the Tsunami Ports Operators Workshop (November 2-3, 2010), Mayagüez, Puerto Rico. Summary: Hazards in port facilities and tsunami history in the Caribbean. Keywords: Mitigation

## **USA – Washington**

Washington Military Department Emergency Management Division Washington State Department of Natural Resources United States Geological Survey National Tsunami Hazard Mitigation Program. (2013). *Understanding Tsunami Hazards in the State of Washington - How Vulnerable is the City of Port Angeles to Tsunamis?* Retrieved from [https://drive.google.com/file/d/1HuI0A3OwuN-7\\_pI0XZiy-ZGgEOG-Z9sv/view?usp=sharing](https://drive.google.com/file/d/1HuI0A3OwuN-7_pI0XZiy-ZGgEOG-Z9sv/view?usp=sharing) Summary: Tsunami hazard, Port Angeles' vulnerability, most vulnerable people, and economic impacts. Keywords: Hazard Assessment

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## **INDIAN OCEAN:**

### **Indian Ocean Region**

UNESCO-IOC. (2019). UNESCO-IOC Facilitates Workshop to Strengthen Tsunami Warning Chain to Ports, Harbors and Coastal Airports. Indian Ocean Regional Workshop, Jakarta, Indonesia (20-22 November 2019). Retrieved from <https://en.unesco.org/news/unesco-ioc-facilitates-workshop-strengthen-tsunami-warning-chain-ports-harbours-and-coastal> Summary: Expert presentations on Japan and Indonesia tsunami impact of tsunamis on ports, harbors, and coastal airports, with best practices on these facilities. Keywords: Hazard Assessment

UNESCO-IOC. (2019). IOTWMS – IOTIC – BMKG Indian Ocean Regional Workshop on Strengthening Tsunami Warning Chain to Critical Infrastructure (20 – 22 November 2010). Retrieved from [http://www.ioc-tsunami.org/index.php?option=com\\_oe&task=viewEventAgenda&eventID=2566](http://www.ioc-tsunami.org/index.php?option=com_oe&task=viewEventAgenda&eventID=2566) Summary: Downloadable files from workshop. Keywords: Hazard Assessment.

Kodijat, M. A. & Kumar, S. (2019). Summary of Workshop Recommendations. BMKG Indian Ocean Regional Workshop on Strengthening Tsunami Warning Chain to Critical Infrastructure (20 – 22 November 2010). Retrieved from [http://www.ioc-tsunami.org/index.php?option=com\\_oe&task=viewDocumentRecord&docID=26987](http://www.ioc-tsunami.org/index.php?option=com_oe&task=viewDocumentRecord&docID=26987) Summary: Framework of end-to-end early warning systems, disaster risk knowledge, warning, dissemination, and communication, preparedness and response, and national and regional action plan. Keywords: Hazard Assessment.