Wave Forces Estimation

Estimation of Wave Forces on Coastal Deck Structures

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The GUI tool estimates the wave impact forces on coastal deck structures. Structural dimensions and wave characteristics are the desired inputs. The tool calculates the impact forces on decks using different empirical formulations developed by various research groups.

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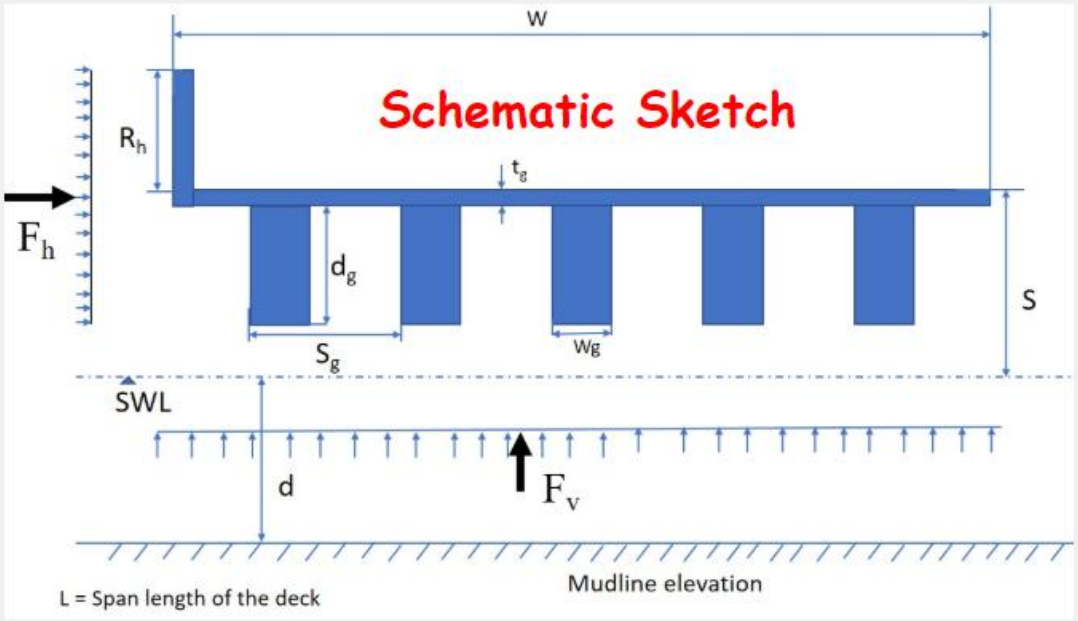
Input Parameters

Environmental Parameters

Density of Seawater: (kg/m^3) ρ =	1025
Maximum Wave Height: (m) H_max =	1.0668
Distance from SWL to wave crest: (m) η_max=	1.0668
Water Depth including Surge: (m) d =	3.62712
Time Period of wave: (s) Tp =	6.32
Wave Length: (m) λ =	57.56



Structural Specifications

Height of Girder: (m) dg =	1
Width of Girder: (m) Wg =	0.6
Spacing of Girders: (m) Sg =	2
Number of Girders: N =	5
Airgap: (m) S =	1.25
Length of Bridge: (m) L =	15.84
Width of Bridge: (m) W =	15.84
Deck Thickness: (m) tg =	0.2
Height of Railing: (m) Rh =	0.8

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Selection of Method

Method: Select ▼

Description:

Relevant References:

Compute Wave Forces

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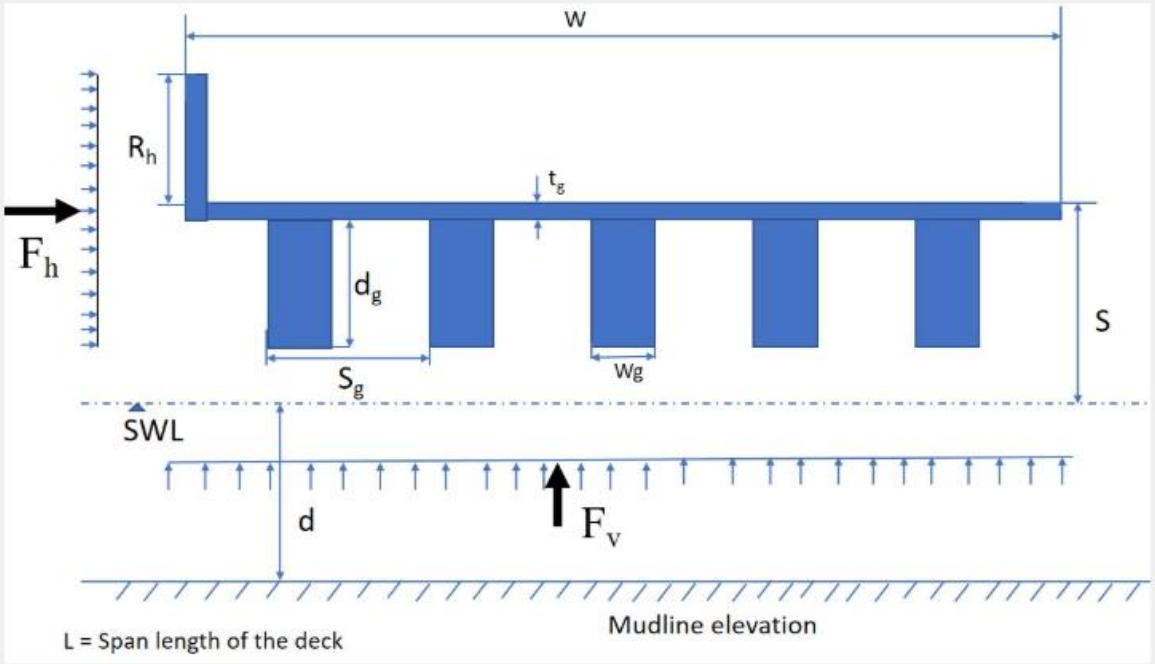
Final Results



Method Used:

H_max / d =

S / H_max =

Coeff. Ch =

Coeff. Cv =

Celerity, C =

Peak Horizontal impact force = kN/m or kN

Peak Vertical impact force = kN/m or kN

Peak Slamming force = kN/m or kN

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About Us

The Graphical User Interface (GUI) tool is developed by the following people:

1. Prof. Manasa Ranjan Behera
2. Swastik Dasgaonkar
3. Rameeza Moideen

Civil Engineering Department, Indian Institute of Technology Bombay, India

Citation

Dasgaonkar, S., Moideen, R., and Behera, M.R. (2021). “GUI tool for estimation of wave impact forces on coastal decks”, Indian Institute of Technology Bombay, Retrieved from https://www.civil.iitb.ac.in/~manasarb/home.html

Link

😀We would love to hear your thoughts❤️ or feedback💡 on how we can improve your experience! 🙂

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Selection of Method

Method: Select

- Select
- McPherson
- AASHTO Type III
- AASHTO Type IV
- AASHTO Type VI
- Solitary Waves
- Focused Waves
- Breaking Waves

Description:

Relevant References:

Compute Wave Forces

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Selection of Method

Method: AASHTO Type VI ▼

Description:

In 2008, American Association of State Highway and Transportation officials developed a guide specification for finding the maximum impact forces on coastal bridges due to coastal storms. The empirical relations were formulated based on a series of simulations carried out on a T-type coastal bridge deck model of scale 1:8, considering bridge and wave parameters (including air

Relevant References:

AASHTO, 2008. Guide specifications for bridges vulnerable to coastal storms. American Association of State Highway and Transportation Official, Washington, D.C, p. 55.

Compute Wave Forces

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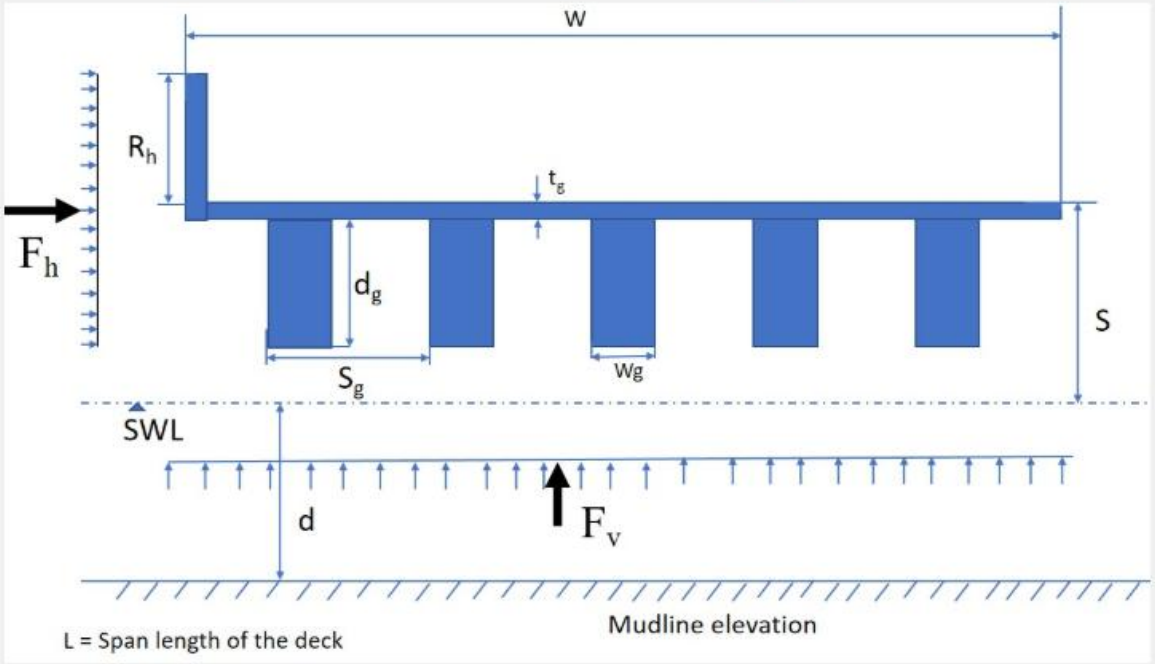

Method Used:

AASHTO Type VI

H_max / d =	0.29412
S / H_max =	1.1717
Coeff. Ch =	None
Coeff. Cv =	None
Celerity, C =	None

Peak Horizontal impact force =	2.6506	kN/m or	41.9849	kN
Peak Vertical impact force =	18.251	kN/m or	289.0965	kN
Peak Slamming force =	-28.9538	kN/m or	-458.629	kN

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