Dynamic Soil Structure Interaction

Review

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(1) What is **SSI？** .

(2) What kinds of phenomena are caused by SSI.

(3) In order to consider the effect of SSI on the response
of structure, the soil-structure interaction system
(Coupling system) is modeled by **Sway-Rocking Model.**

(4) The Sway-Rocking Model is supported by
"**Dynamic Impedance Function**",
and is subject to
"**Foundation input motion**"
as an earthquake disturbance.

(5) The Dynamic Impedance Functions are expressed by complex numbers.
The real part of the Dynamic Impedance Function corresponds to the **dynamic stiffness**, and the imaginary part is related to **damping**.
Dividing the imaginary part by circular frequency , the **damping coefficient C** is obtained.

(6) This damping is attributable mostly to the **radiation wave** emitting from the foundation into soil. Particularly, this damping is called "**Radiation Damping**".

(7) For the calculation of the **Dynamic Impedance Function** and the **Foundation Input Motion**, we assume the massless rigid foundation. The dynamic Impedance Function equals to the inverse of the response of the massless rigid foundation when unit force vector is applied. The Foundation Input Motion equals to the response of the massless rigid foundation when the earthquake disturbance is applied.

(8) The natural frequency of the building is different from the fixed base natural frequency.

(9) Larger damping factor is given by SSI.
   The damping factor of the coupling system is
   much larger than that of building itself.

(10) This tendencies of (8) and (9) becomes
   more remarkable in lower rise or stiffer building
   on weaker soil.