Fig. 1 Bodies in contact with each other
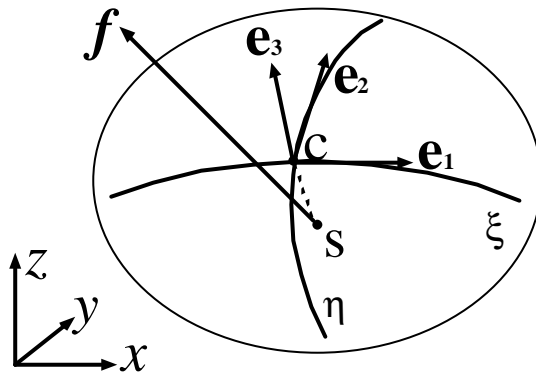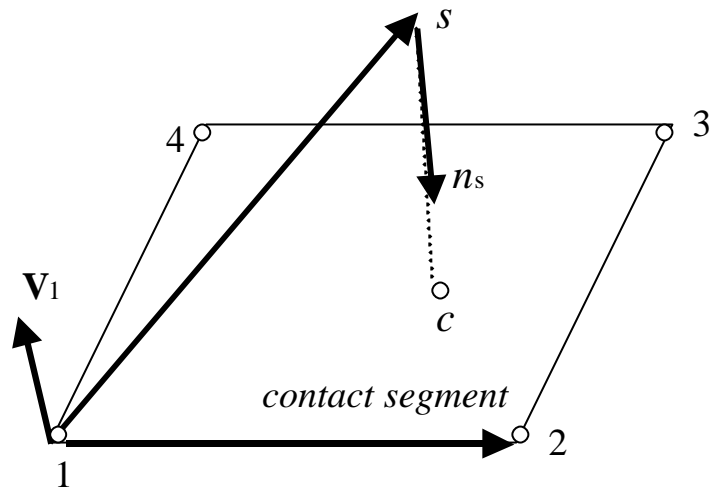

Fig.2 Frame for calculation of the contact force

$$V_i = \vec{ik} \times \vec{is} \quad (i = 1,4)$$

$$k = i + 1 \ if \ i = 1,3, \ otherwise \ k = 1$$

Fig. 3 Local contact search algorithm

Welded joint
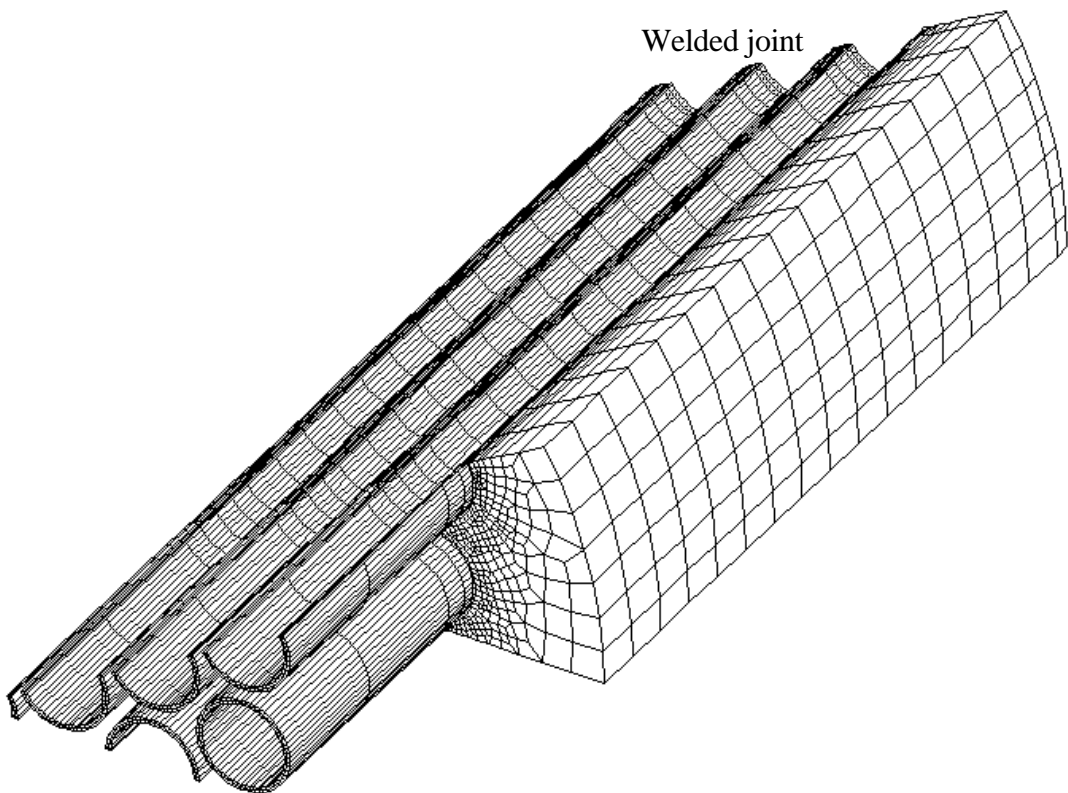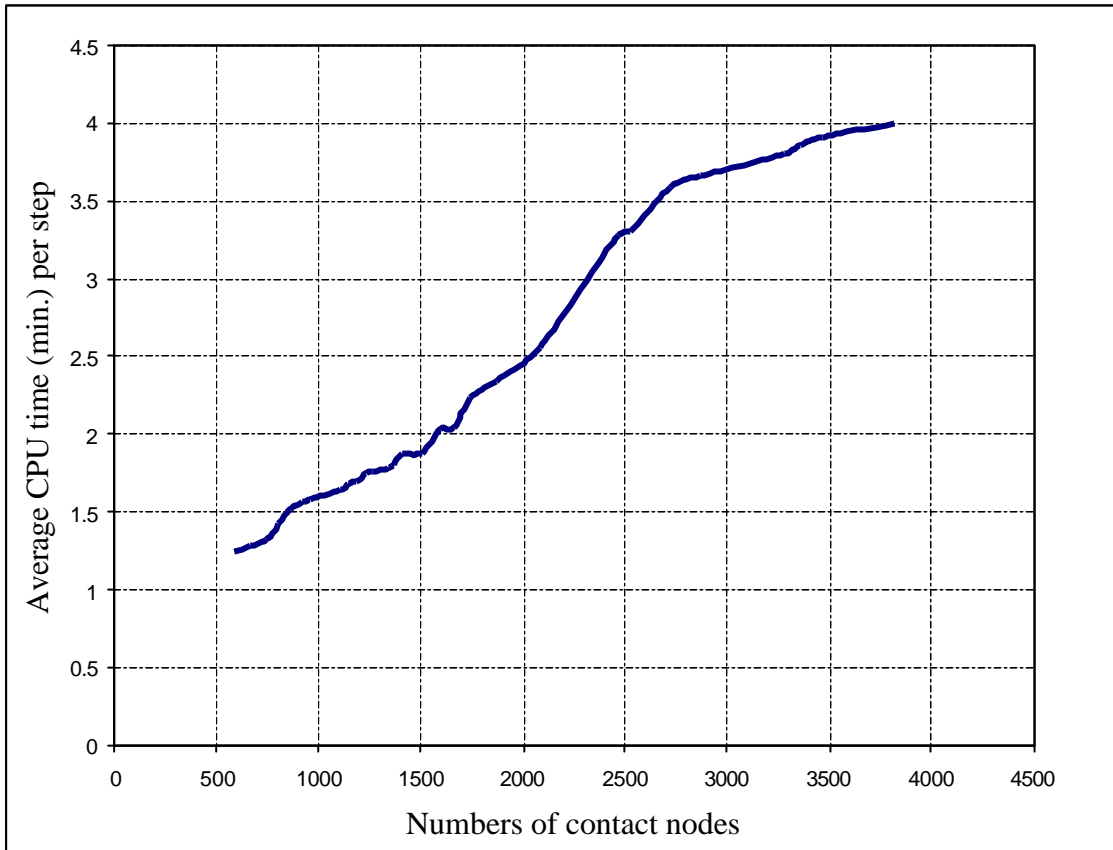

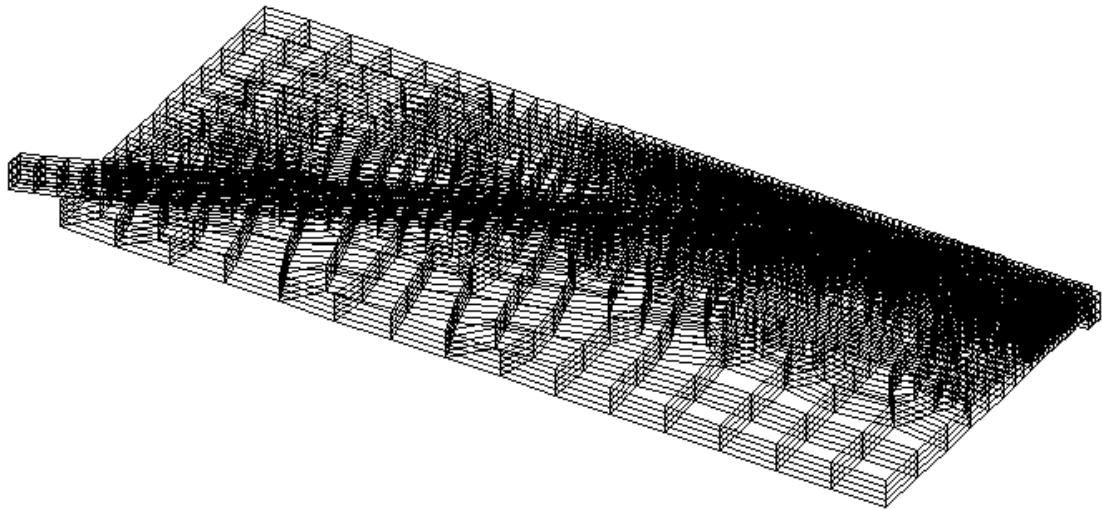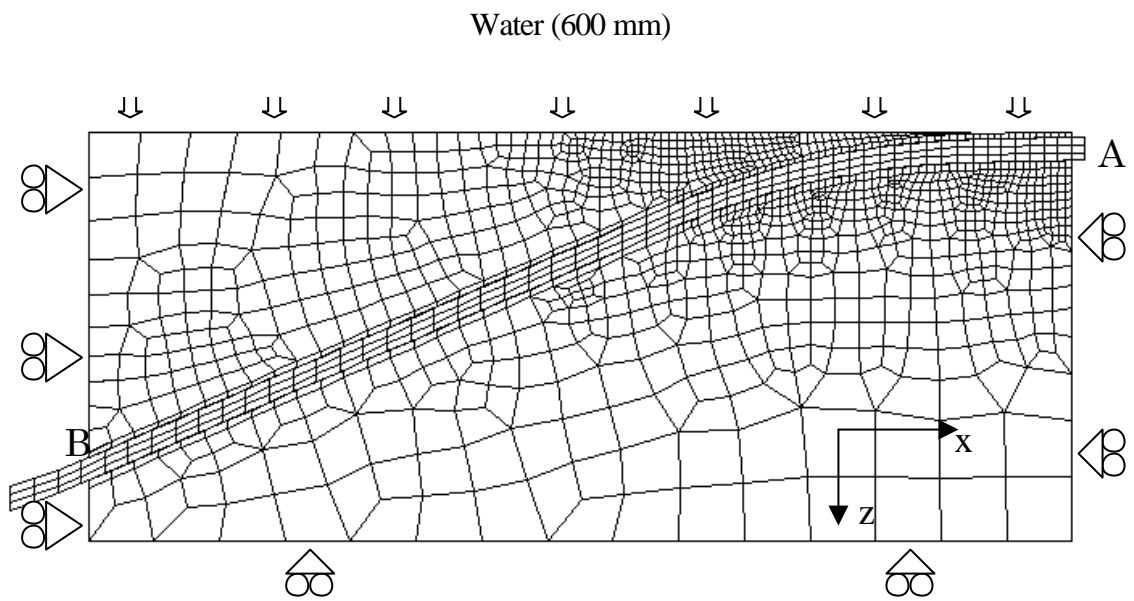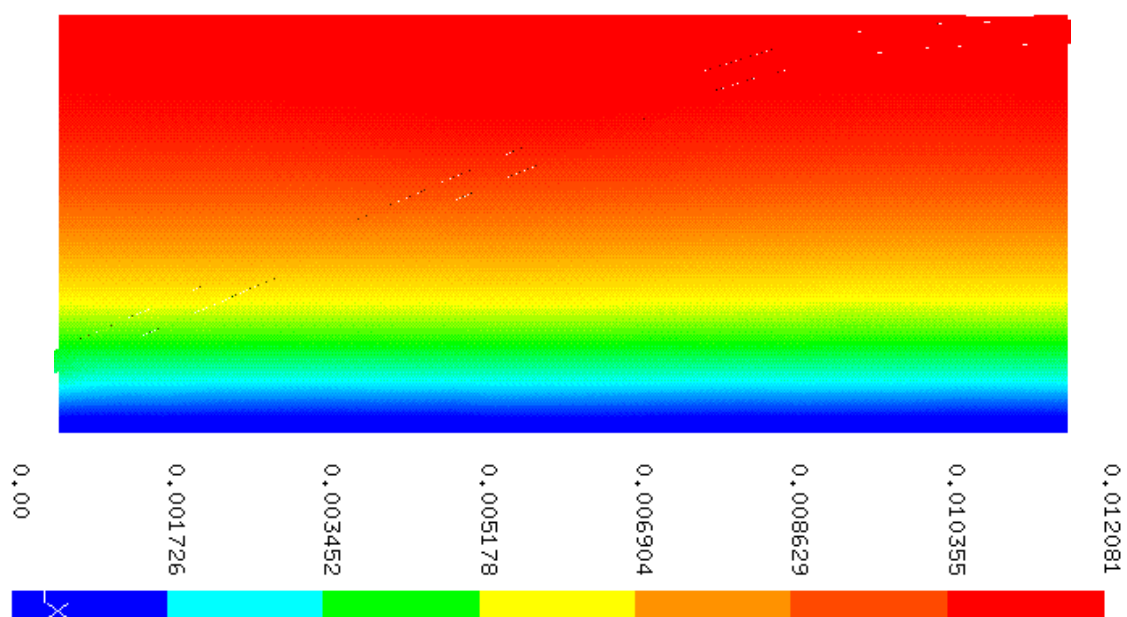Fig. 4 The geometry and mesh of tube and tubesheet structure analyzed

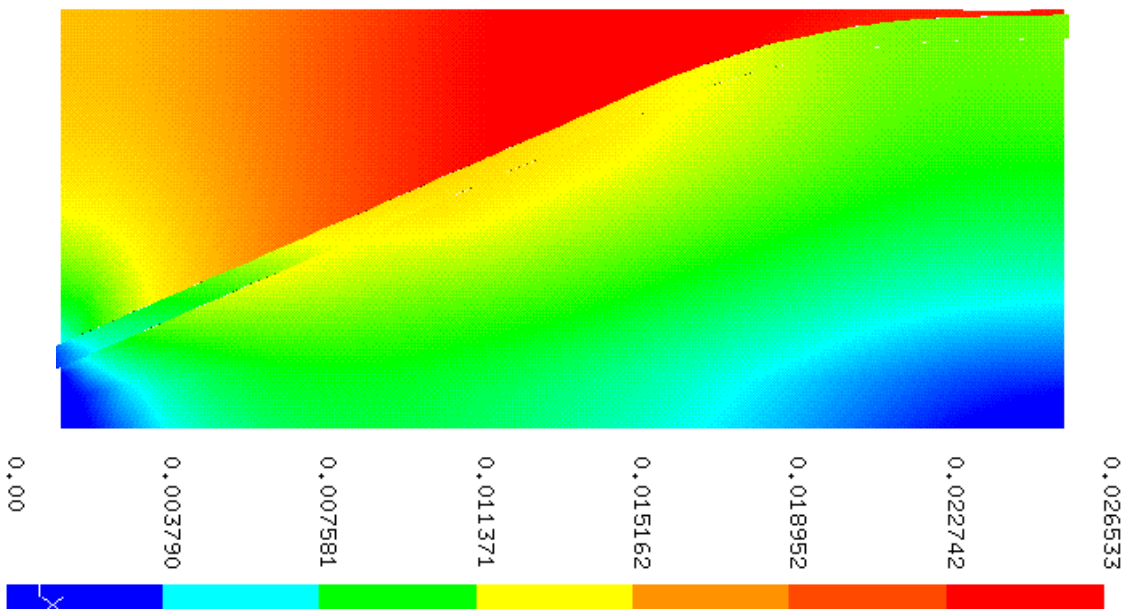Fig. 5 Average CPU time vs. numbers of contact nodes

Water (600 mm)

Dimensions: 20038 x 51 x 600 mm^3

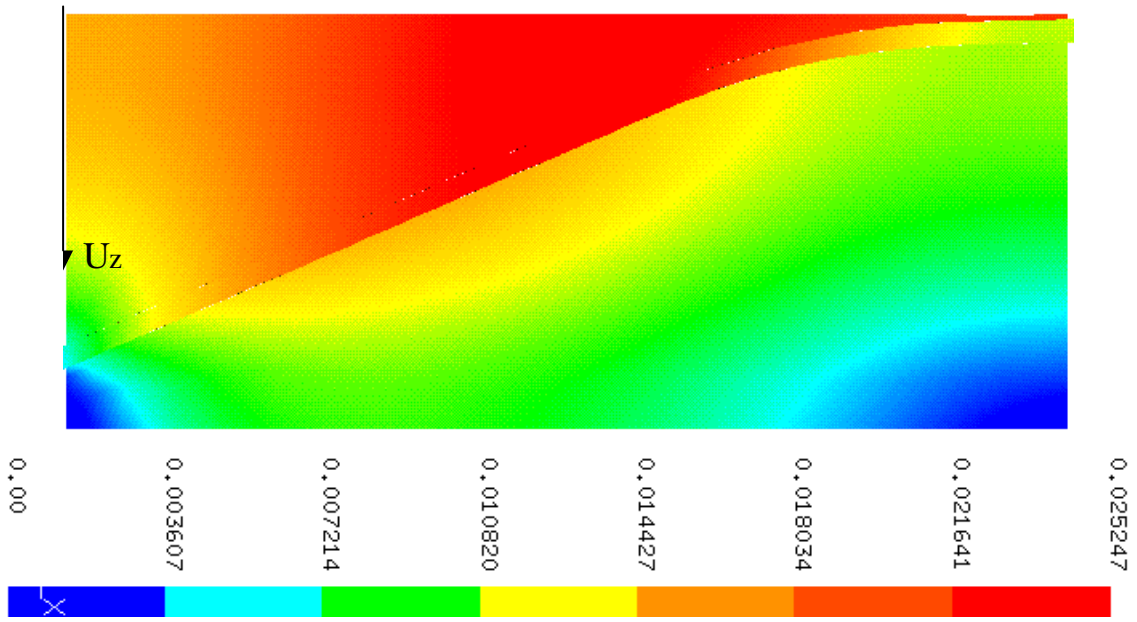Loading condition: gravity force + hydraulic pressure

Fig. 6 The Northeast fault model with the Pacific plate analyzed

(a)

(b)

Uz

0.00 0.003607 0.007214 0.010820 0.014427 0.018034 0.021641 0.025247

(c)

Fig. 7 Displacement distribution at different friction conditions:
(a). $m = 0.5$; (b). $m = 0.3$;

(c). $m = 0.3$ ($U_z \leq 150$ or $U_z \geq 278$), otherwise $m = 0.5 - 0.025\,ln(\dot{\tilde{u}}_{eq}^{sl}/0.01)$