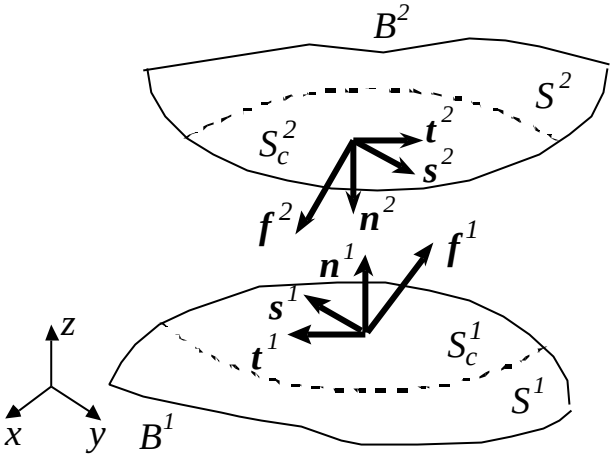


Fig. 1 Bodies in contact with each other

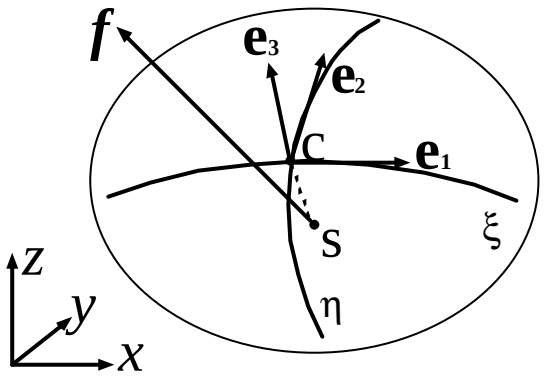
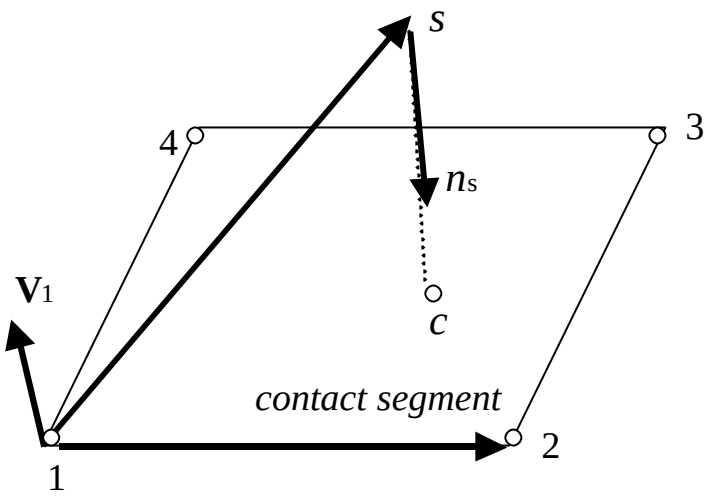


Fig.2 Frame for calculation of the contact force



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

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

Fig. 3 Local contact search algorithm

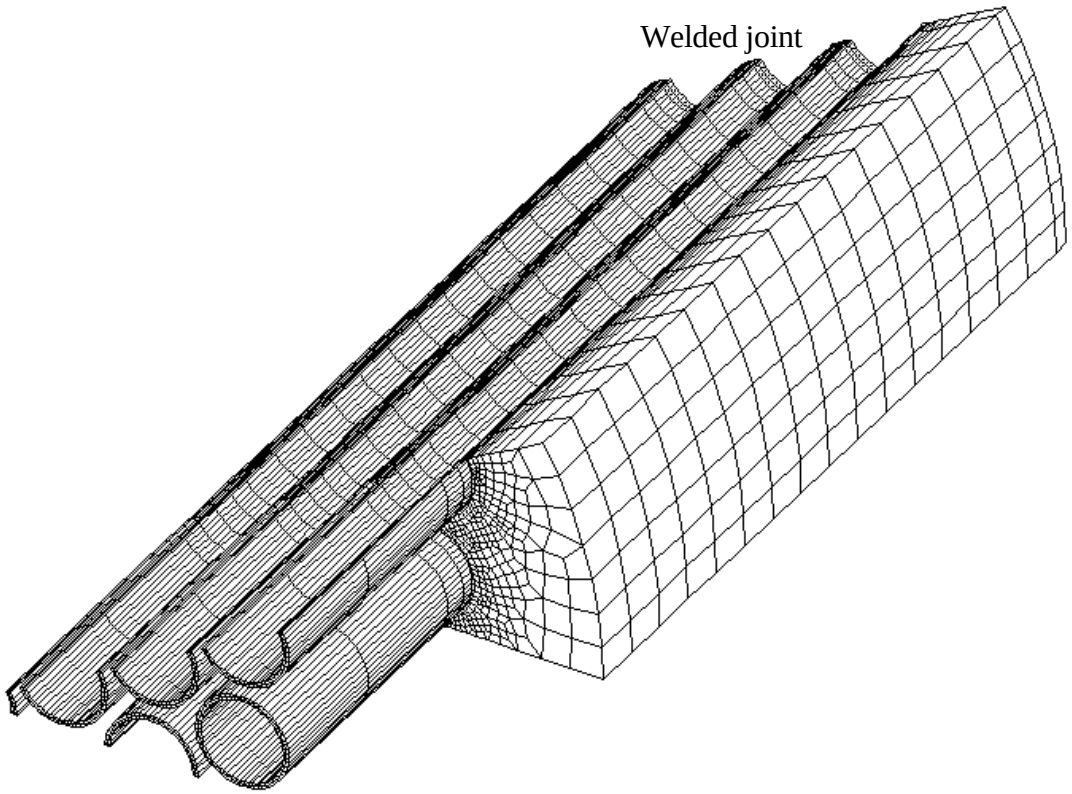


Fig. 4 The geometry and mesh of tube and tubesheet structure analyzed

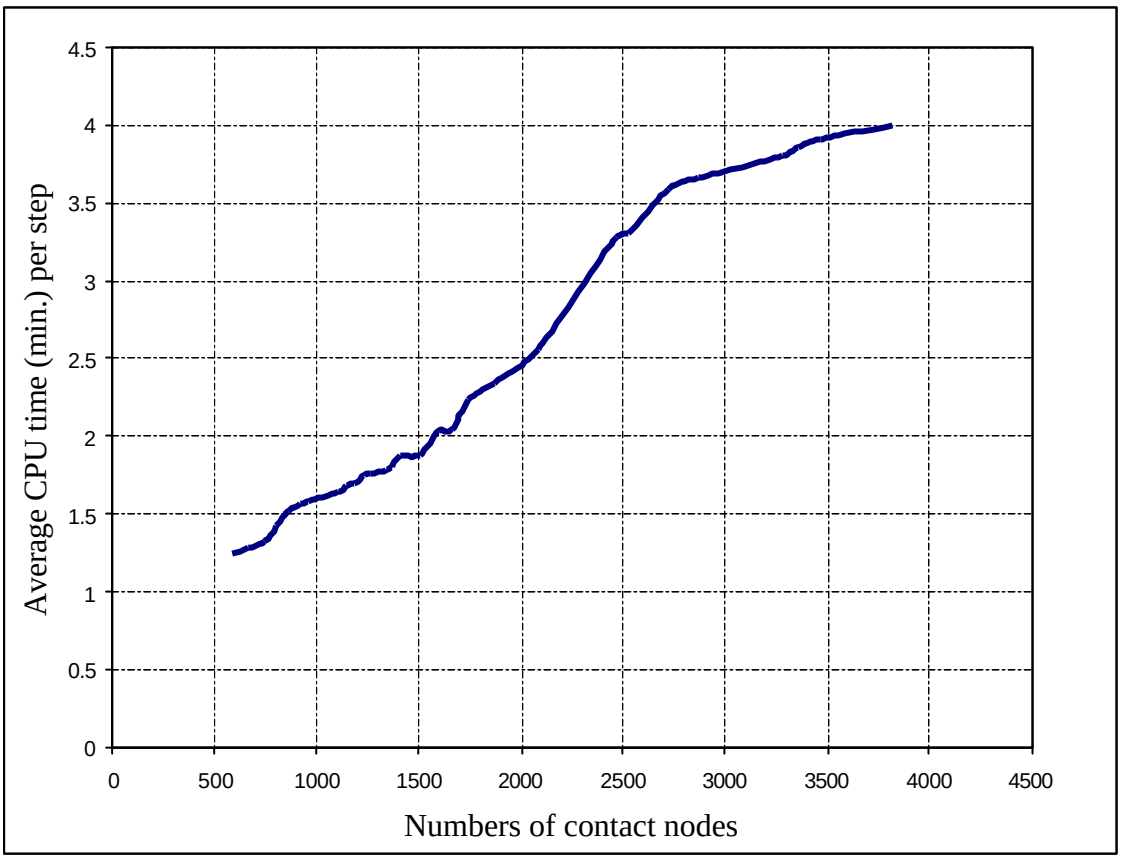
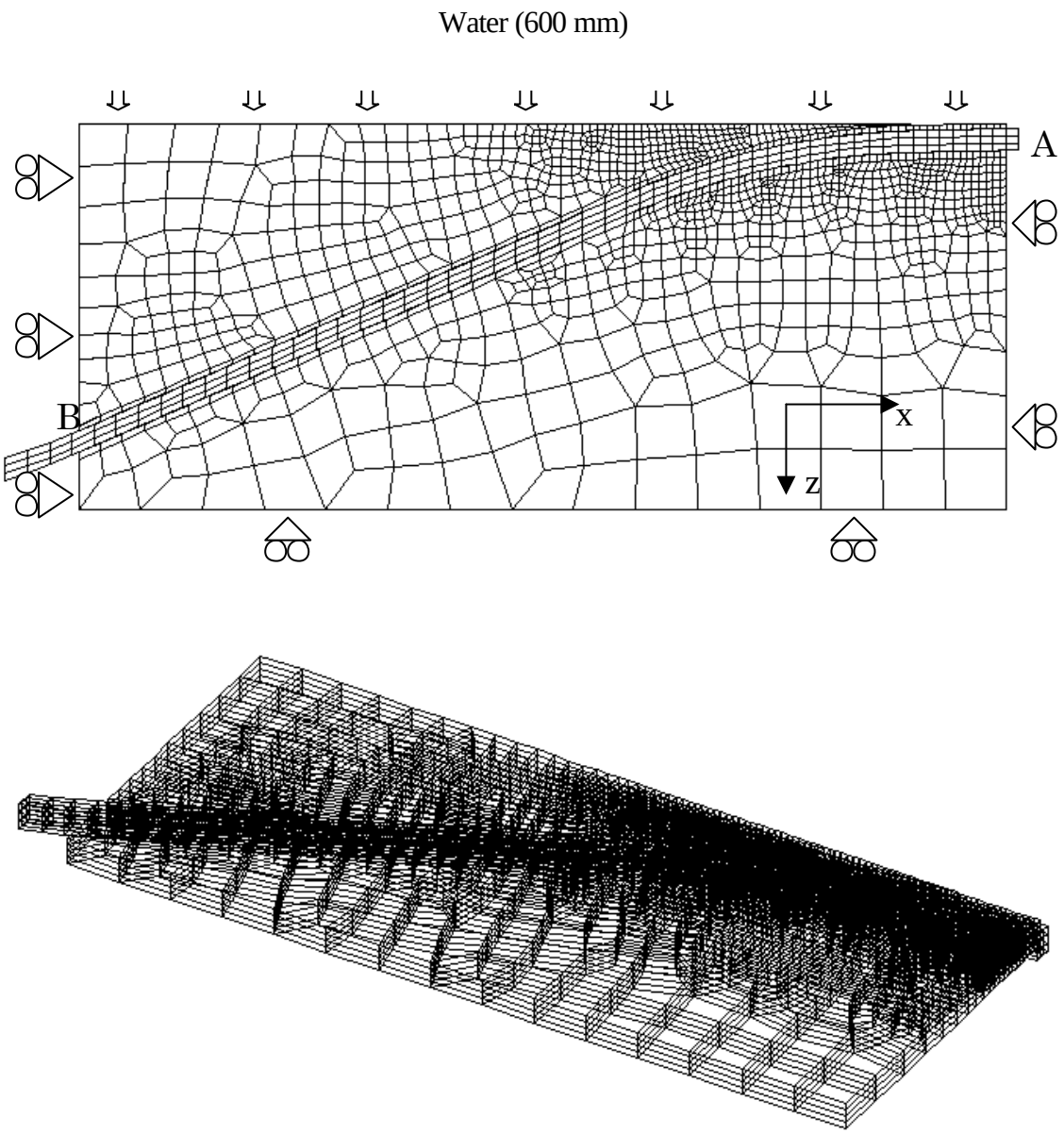


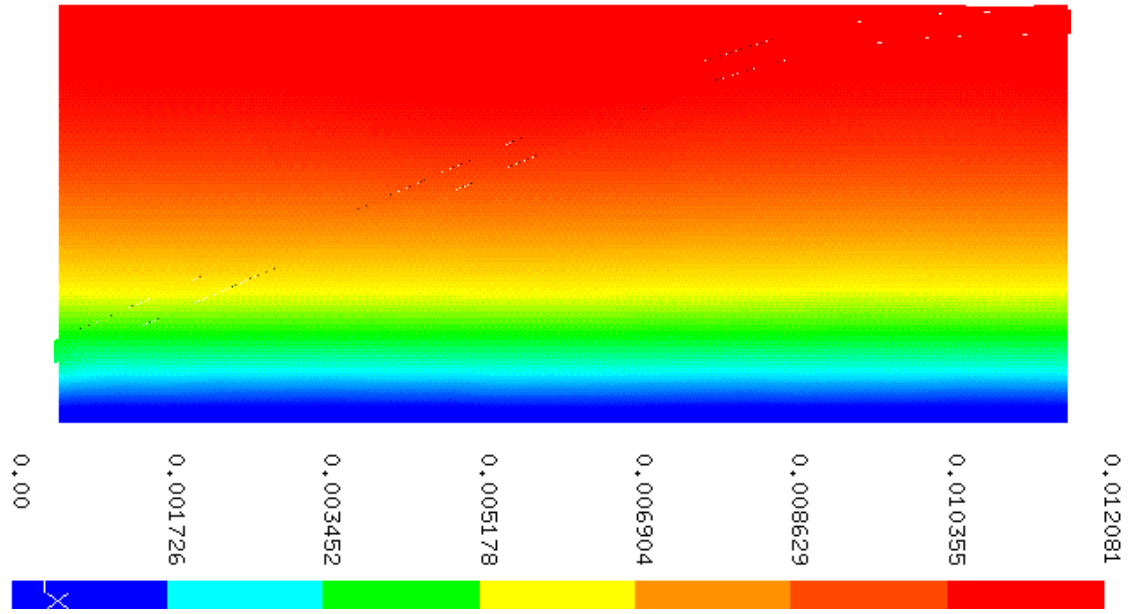
Fig. 5 Average CPU time vs. numbers of contact nodes



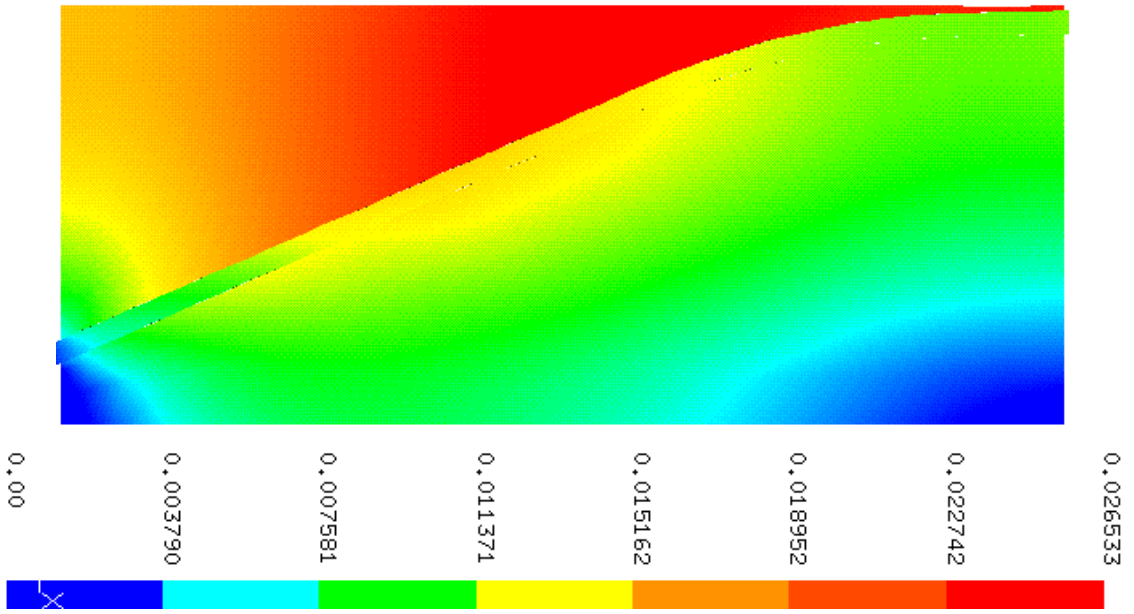
Dimensions: 20038 x 51 x 600 mm^3

Loading condition: gravity force + hydraulic pressure

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


0.00
0.001726
0.003452
0.005178
0.006904
0.008629
0.010355
0.012081

(a)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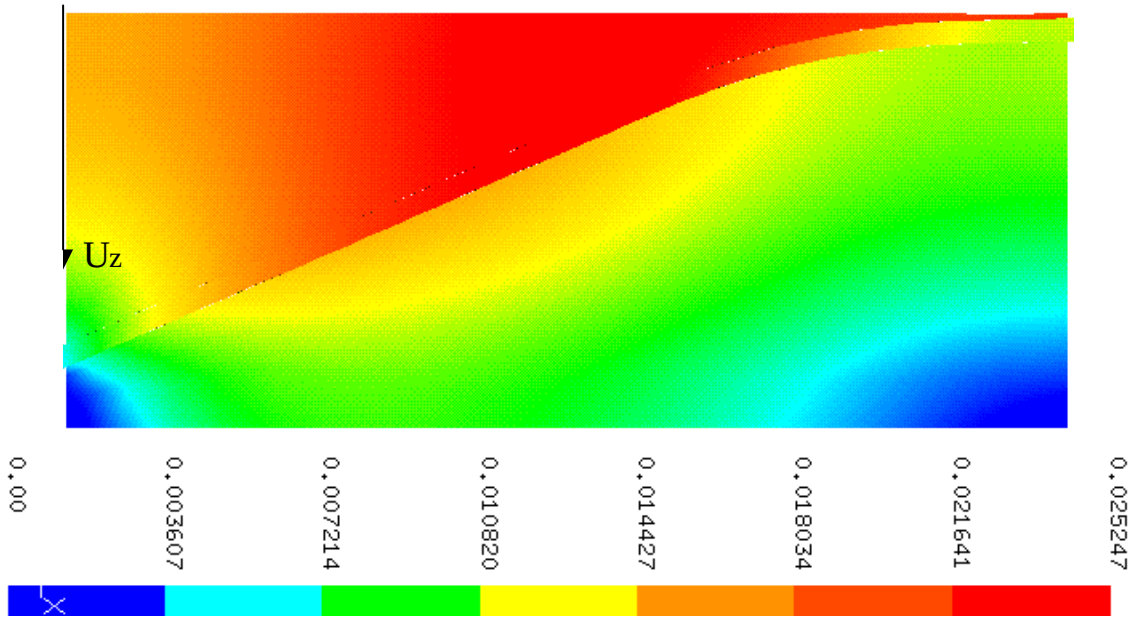
0.003790
0.007581
0.011371
0.015162
0.018952
0.022742
0.026533

(b)



(c)

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

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