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072808

# COMPONENTS OF TORSION IN DESIGN SECTIONS

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First draft: July 27, 2008

This Technical Note explains the components of torsion that are reported for the design sections in ADAPT-Builder Programs. Refer to Fig. 1. It is the view of a typical design section. The design section has a finite length comparable with the dimensions of the structure. The centroid of the design section is shown as point O.

Builder programs report six actions at point O. These are the sum of the forces that act on the infinitesimal elements on the design section (mxx, nz, nx,ny,, mxy).

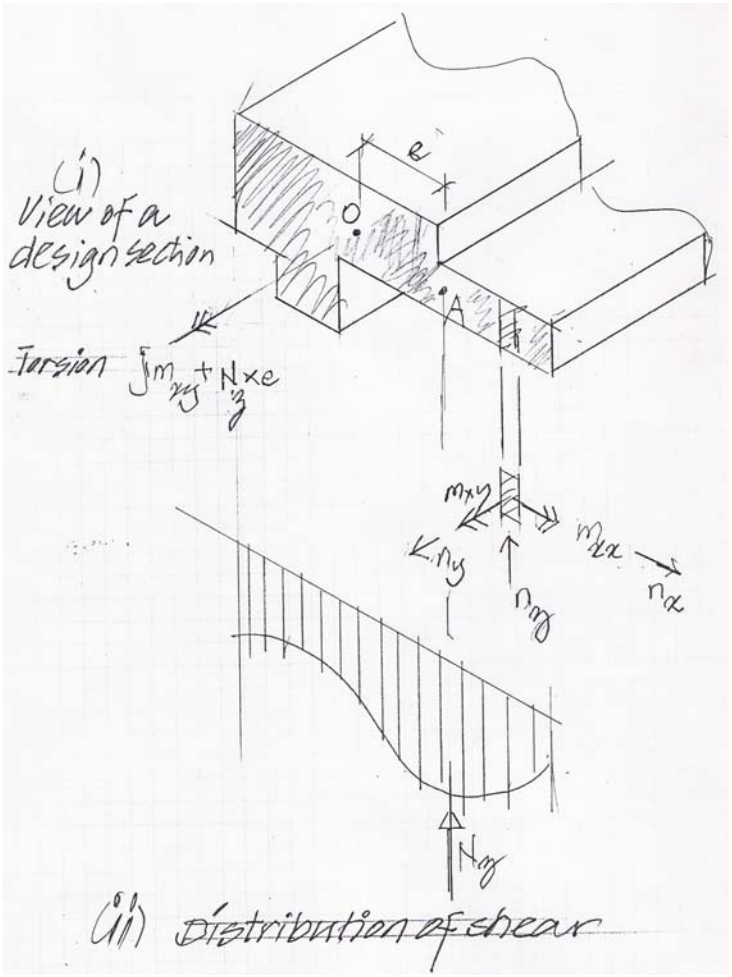


FIGURE 1 VIEW OF A DESIGN SECTION AND SHEAR

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The distribution of the shear normal to the plane of the design section (nz) is shown in part (ii) of the figure. The resultant of the vertical shear Nz acts at point A on the design section. The program shifts the point of action of Nz to the centroid of the section at O. In addition, the program adds up the twisting moments on the infinitesimal elements shown in the figure to Mxy.

Following the summation carried out in the preceding, the torsion reported by the program at point O is the sum of the twisting moment on the design section and the moment generated at the centroid due to shift of the point of action of shear normal to the plane of the slab.

Strictly speaking, for sections that are not uniform, such as the one shown in Fig. 1, the horizontal shear nz on the infinitesimal element will add up to a total force Nx in the plane of the design section with an eccentricity with respect to the centroid O. Builder programs capture this component too, and add it to the torsion reported. However, for uniform sections this component will be zero. For non-uniform sections it is generally not significant, but included in the results by the program.