by the contour interval. This approach is more difficult than in the two-dimensional case because the chart must have a variable scale parameter to allow for the different depths of the slabs.

(b) *Analytical methods.* By using an n-sided polygon to approximate the outline of the vertical section of a two-dimensional body, one can calculate the gravity effect by hand or by digital computer (Talwani *et al.*, 1959). A simple section is illustrated in fig. 2.34. It can be shown that the gravity effect of this section is equal to a line integral around the perimeter (Hubbert, 1948). The relation is

$$g = 2\gamma\sigma \oint z \, d\theta.$$

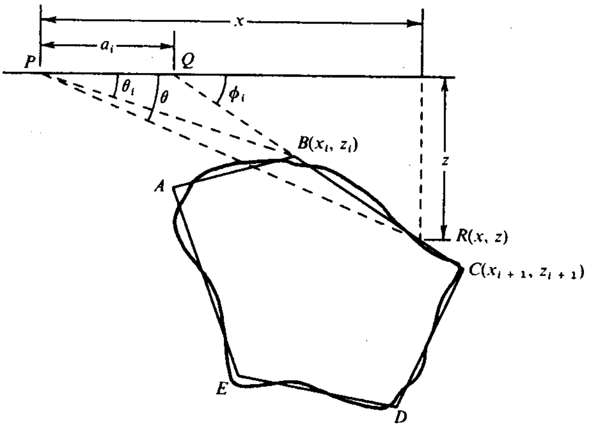

Fig. 2.34 Polygon approximation of irregular vertical section of two-dimensional body.

From the geometry of fig. 2.34 we have the following relations:

$z = x \tan\theta = (x - a_i)\tan\phi_i$, or $z = (a_i \tan\theta \tan\phi_i)/(\tan\phi_i - \tan\theta)$.

The line integral for the side BC is

$$\int_{BC} z d\theta = \int_B^C \frac{a_i \tan\theta \tan\phi_i}{\tan\phi_i - \tan\theta} d\theta = Z_i.$$

Thus,
$$g = 2\gamma\sigma \sum_{i=1}^{n} Z_i. \tag{2.54a}$$

In the most general case, Z_i is given by

$$Z_i = a_i \sin\phi_i \cos\phi_i \left[(\theta_i - \theta_{i+1}) + \tan\phi_i \,.\, \log\left\{\frac{\cos\theta_i(\tan\theta_i - \tan\phi_i)}{\cos\theta_{i+1}(\tan\theta_{i+1} - \tan\phi_i)}\right\}\right], \tag{2.54b}$$

From Telford et al. Applied Geophysics, Cambridge U., 860 p., 1976 - Really good background info.

$$\theta_i = \tan^{-1}\left(\frac{z_i}{x_i}\right), \quad \phi_i = \tan^{-1}\left(\frac{z_{i+1} - z_i}{x_{i+1} - x_i}\right), \quad a_i = x_{i+1} - z_{i+1}\cot\phi_i$$
$$= x_{i+1} + z_{i+1}\left(\frac{x_{i+1} - x_i}{z_i - z_{i+1}}\right).$$

This technique has also been used for three-dimensional bodies by replacing the contours in the horizontal plane with n-sided polygons. The solution, from line integrals of the polygons, is essentially a more complicated version of eq. (2.54a).

Terrain corrections may also be computed by this method. For example, in the three-dimensional case, polygons are fitted to the topographic contours.

2.6.5 *Characteristic curves*

Most of the formulae for simple gravity shapes are far from simple to apply. Even when we can assume with some confidence that a field result may be reason-