

Another common phenomenon is the «ridge fracture»: any corner in a shocked sample may be neatly split, except near the outermost tip, where common shear fracture normally occurs, Fig. 27. These have been discussed in detail by RINEHART and PEARSON [14] and by FOWLES and ANDERSON [15]. The latter have performed a linear elastic analysis of the configuration shown in Fig. 28 and 29. In Fig. 28 the line labelled  $\Phi$  represents a compressive wave

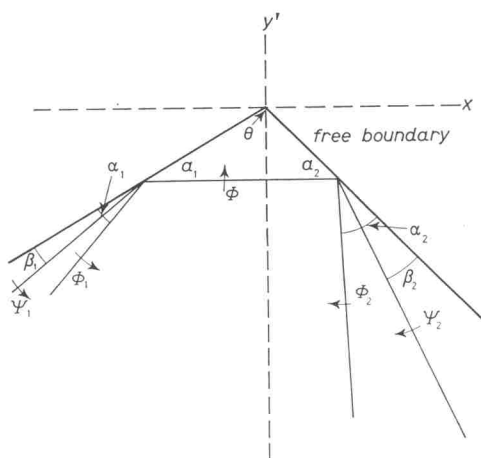


Fig. 28. - Wave incident upon corner.  
(From ref. [15]).

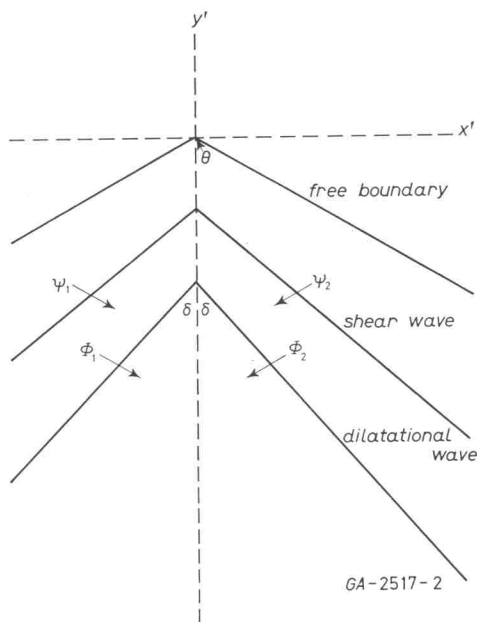


Fig. 29. — Interaction of reflected waves.  
(From ref. [15]).

running into a corner, generating reflected dilatation and shear waves  $\Phi_1$ ,  $\Phi_2$ , and  $\psi_1$ ,  $\psi_2$ , respectively. At a later time, shown in Fig. 29, only the reflected waves remain, and these meet along the dotted axis labelled  $y'$ , the points of intersection running down as time progresses. The interacting tensile waves,  $\Phi_1$  and  $\Phi_2$  and/or shear waves  $\psi_1$  and  $\psi_2$  produce a fracture running along  $y'$  if the amplitude of the incident wave is sufficiently great. Their analysis, which agreed reasonably well with experiments, indicated that, for a given incident wave, the maximum fracture stresses were developed for  $\theta \simeq 120^\circ$ . The shear fracture near the corner in Fig. 27 is very likely due to the finite time required for fracture, as in eqs. (100)-(102).

An interesting type of fracture occurs when a layer of explosive is detonated in contact with a metal plate. The situation is characterized in Fig. 30. In Fig. 30 *a*) the detonation front is travelling with speed  $D$  across the surface

of the plate, inducing a trailing shock,  $\mathcal{S}$ . Pressure on the plate falls quickly behind the detonation front as indicated. This produces a corresponding rarefaction behind  $\mathcal{S}$ . The shock  $\mathcal{S}$  is reflected from the bottom surface as a rarefaction,  $\mathcal{R}$ , and the interaction of  $\mathcal{R}$  with the rarefaction behind  $\mathcal{S}$  produces a tension stress field which may be strong enough to fracture the plate along

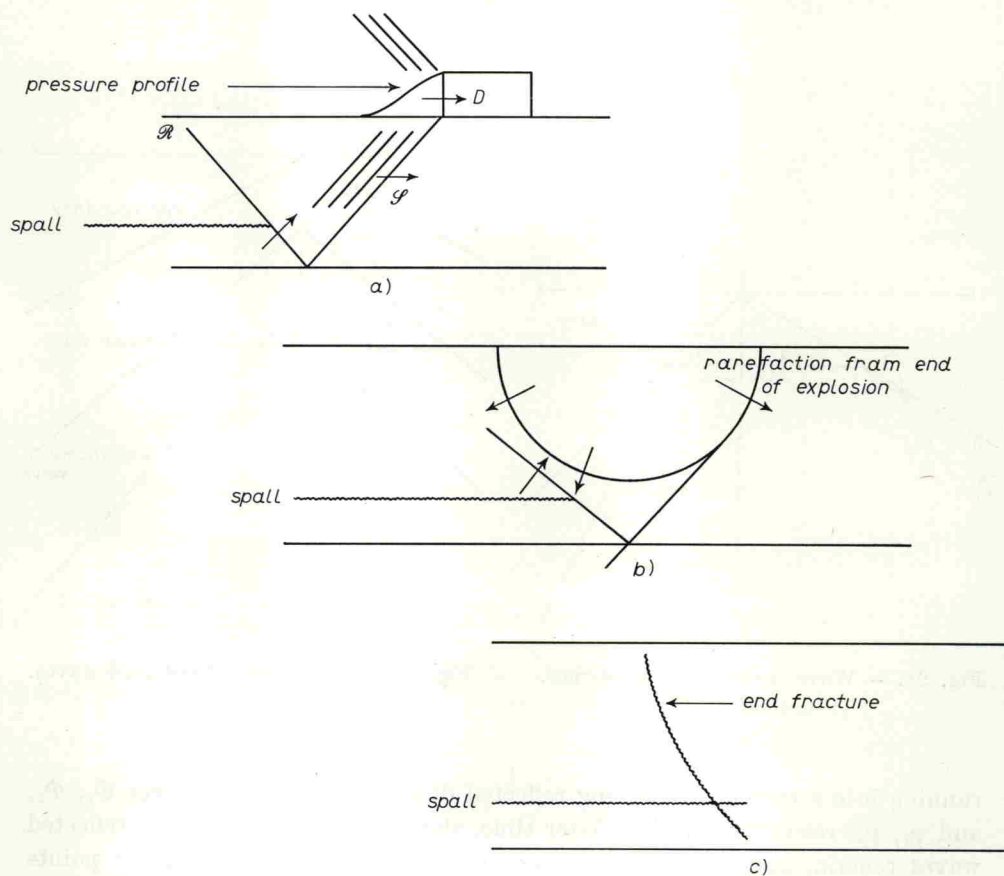


Fig. 30. - Generation of end fracture. a) Steady waves from detonating explosive; b) rarefaction generated at end of explosive intersects with bottom rarefaction; c) end fracture resulting from interaction.

the surface labelled «spall». When the detonation reaches the end of the explosive charge, a rarefaction is generated with a more or less circular wave front as shown in Fig. 30 b). This rarefaction, interacting with  $\mathcal{R}$ , produces a stress field which results in an end fracture with orientation shown in Fig. 30 c). The geometry of this interaction has been worked out [16], but no one has