pin identity and setback distances. The slope of the time-distance plot then defines the shock velocity. Figure 13 illustrates a typical plot. In practice the velocities are determined by an electronic computer from a linear least squares fit of the time-distance data.

D. Flying Plate Technique

The highest pressures which can be attained in materials in contact with explosives are limited by the highest detonation pressure generated by the explosive and the nature of the material. For instance, PBX-9404 representing the most energetic of the explosives produces a maximum pressure in 2024 dural of about 430 kbar. However, pressures in the megabar range in dural can be achieved by the flying plate or free run technique.[22, 35] This technique consists of accelerating a thin metal plate by a plane wave explosive system and allowing the plate to traverse a two or three centimeter air gap before striking a target plate containing the experimental apparatus.

Consider a metal flyer plate that is very thin compared to the explosive thickness. The shock wave transmitted into the flyer plate from the explosive is reflected from the plate-air interface or free surface as a rarefaction wave. This accelerates the interface to a specific free surface velocity. The release wave travels back through the plate and is reflected at the explosive gas-metal interface as a shock wave and at the same time a rarefaction wave is transmitted into the gas. The reflected shock interacts with free surface again accelerating it to a higher velocity although decreased in incremental magnitude relative to the previous encounter. Successive interactions cause the flyer plate to finally achieve some terminal velocity, U_t,