

BLAST WAVE MEASUREMENT TECHNIQUES: PHOTO-OPTICAL METHODS

DEWEY, J.M.

The next MABS Monograph will be a compendium of blast wave measurement techniques. The following is a summary of the section of the monograph that will describe photo-optical methods for the study of shock and blast waves.

Photographic methods for observing and measuring the physical properties of blast waves are as old as the discovery of shock waves themselves, dating from the end of the last century with the work of Mach (1878), Dvorak (1880) and Boys (1893). Some advantages of flow visualization methods are that they are non-intrusive, and do not alter the physical properties that are being measured. Also, they provide information about a large region of the flow field rather than a measurement at a single point. Of equal importance is the fact that the visualization of the flow field provides all understanding of associated phenomena which may not be revealed by other techniques. For example, photography may show a precursor anomaly or supersonic debris that causes a nonclassical wave profile in a gauge record.

Without photography these phenomena can only be conjectured. Photoagrammetric methods are widely used to study shock waves in blast chambers and shock tubes in the laboratory, and free field blast waves from large and small scale explosions. The advent of new techniques such as holographic interferometry, high speed videography and automated analysis continues to enhance the capabilities of flow visualization methods.