

6 RECOMMENDATIONS

During the course of experimentation and numerical analysis a number of points arose. These points are outlined below. The recommendations are intended to take the results obtained in this dissertation to the next level and to improve the testing facility.

- The research carried out for this dissertation has only scraped the surface of what proves to be a very interesting shock wave reflection phenomenon. The results shown in this work describe in much detail the reflections occurring off the two surfaces, the resulting primary and secondary waves, as well as the general flow properties. It is recommended that further detailed analysis of the shock reflection for all four types of valley geometries be conducted to draw conclusive results of the exact geometry and location of the three-dimensional shock surfaces. The evidence of what may be a high pressure region is seen in the triangular, parabolic and conical valleys. It is recommended that this region be looked into with far more scrutiny. Three-dimensional modeling of four rectangular valleys and four triangular valleys was completed in this research, it is suggested that similar models be created for the rest of the test pieces.
- Throughout the research many problems occurred with the use of the Seitz shock tube at the University of the Witwatersrand. It is recommended that a full inspection of all solenoids and valves be completed, as well as a careful inspection of the expansion chamber. Many initial schlieren images obtained during experimentation showed the presence of transverse waves. A thick pile carpet, situated at the beginning of the expansion chamber, was originally designed to dissipate these transverse waves. However this carpet had grown old and much time was spent trying to incorporate a new carpet into the expansion chamber. However, the new carpet did not have the desired effect as the presence of the transverse waves in the images continued. After much deliberation, it is recommended that the expansion chamber be closely inspected, and if needed be disassembled to ascertain whether there is a slight divot on the inner surface of the chamber.
- Towards the end of the research the shock tube had to run in a semi-automatic state. This was due to problems experienced with test initiation, camera triggering, incorrect incident

Mach number calculations and automatic test procedure errors. These errors are most probably attributed to the data acquisition system. It is therefore suggested that the system be updated or at least serviced.

- The experimental optical system used in the research only allowed two-dimensional images to be obtained. Although the numerical analysis allowed the experimental results to be validated in the two-dimensional case, it is suggested that an optical system, which would allow three-dimensional experimental images to be obtained, be designed and implemented in the Seitz shock tube. This would enable direct three-dimensional experimental and numerical comparison.