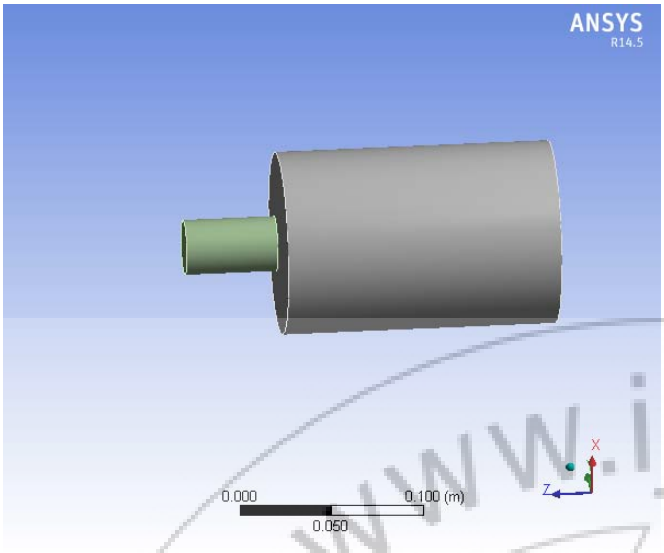

Figure 5.1: Cylindrical Tank Model

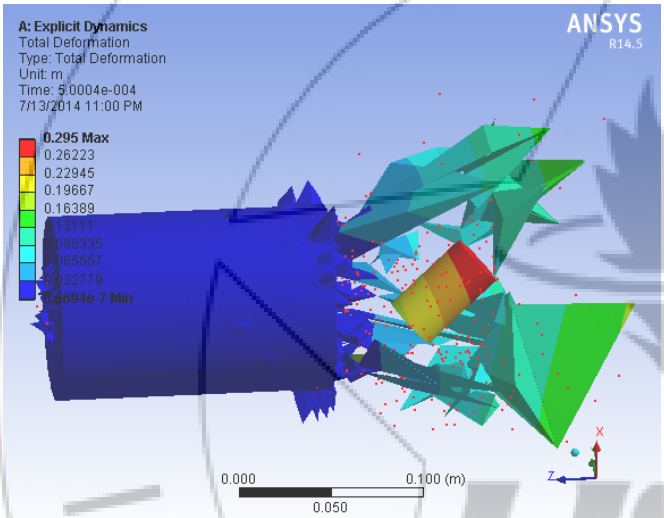

Figure 5.2: After Impact

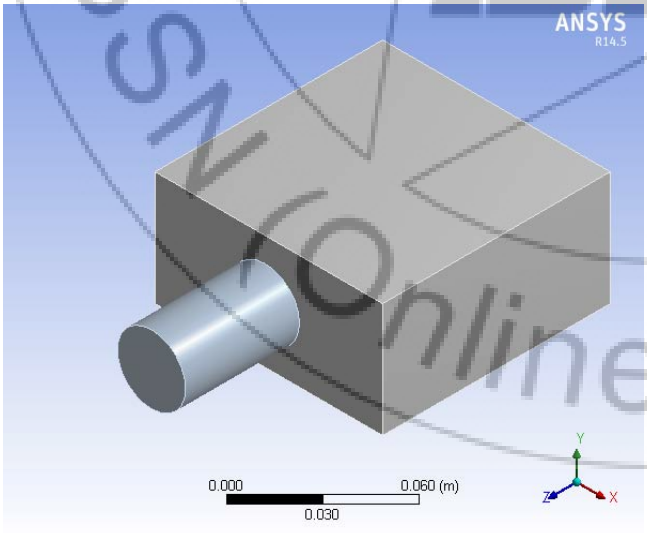

Figure 5.3: Rectangular Tank Model

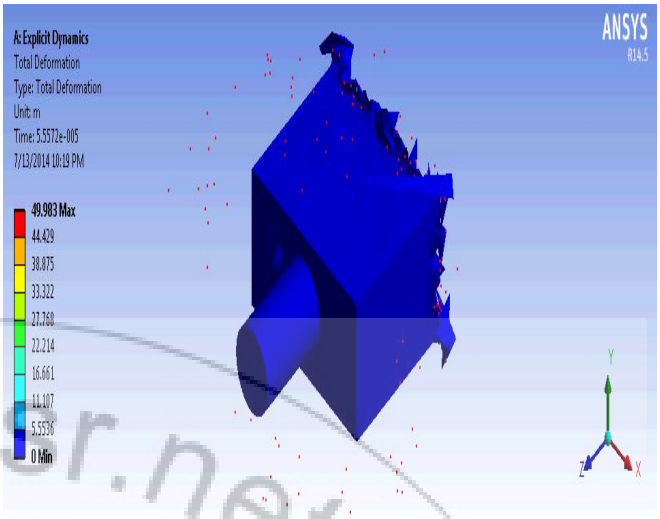

Figure 5.4: Post Impact1

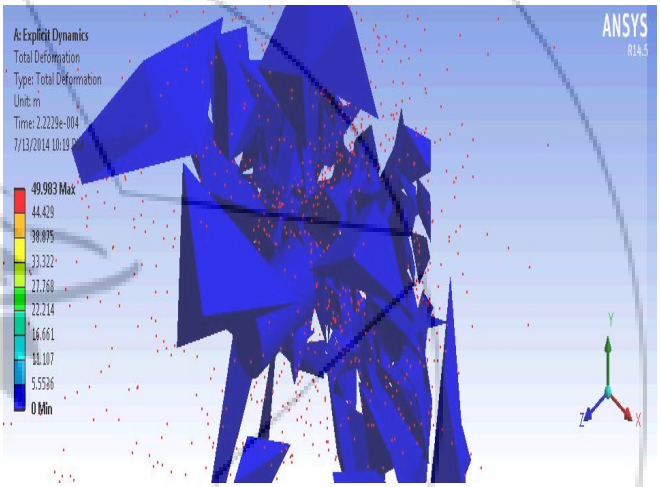

Figure 5.5: Post Impact 2

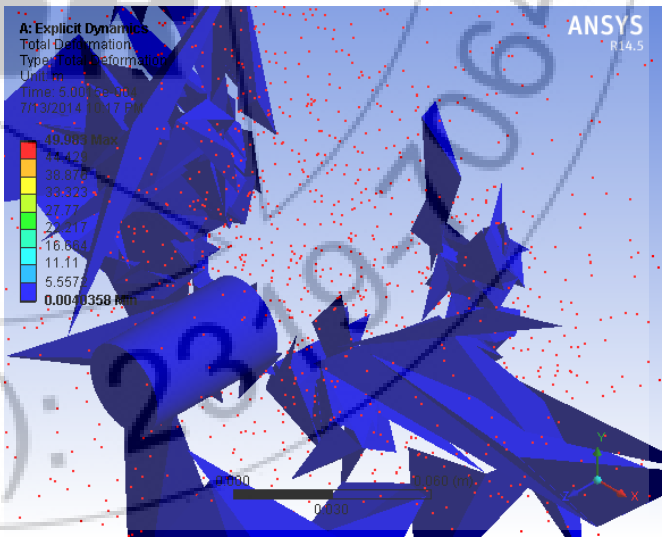

Figure 5.6: Post Impact 3

Figure 5.1 shows a cylindrical tank subjected to an impact along its axis. Figure 5.2 shows the aftermath of the impact. The piercing pipe protrudes to the other end while fracturing the whole tank on both ends. The nature of the impact on the exit end shows a splatter of broken pieces which could also resemble the splatter of fuel that can occur in such a scenario.

Figure 5.3 shows a rectangular tank in the same configuration as figure 5.1.intermittently the effect of a crushing force is observed at the back of the tank, as shown in figure 5.4, which is caused by obstruction from other body parts on the vehicle. Figure 5.5 and 5.6 show the different stages of the after impact destruction of the fuel tank. In this analysis there is total destruction of the fuel tank.

6. Discussions and Conclusions

It is clear from the analysis carried out that the test procedure does not imply that if a particular fuel tank passes the test then it is safe from all accidents situations. The bus accident in question was unique in the sense that a metal pipe pierced the bus body and had direct impact with the fuel tank. It is likely that the full weight of the bus was applied on the pipe via the fuel tank. This means that the point of contact was the fuel tank surface. Accident scenarios investigations predicted that the tank was displaced and spilled fuel into the passenger compartment, whose floor was made of chequered plywood.

The analysis reflects that it is not sufficient for manufacturers to install fuel tanks and argue safety based solely on the test standard. Although the fuel tank was not in the immediate frontal impact zone, it was in this case vulnerable to piercing impact because of the peculiar construction of the bus. Rear engine buses as compared to front engine buses are more prone to extensive damage in frontal impacts.

The authors suggest the use of a barrier to protect the tank from such kinds of impact. Manufacturers are usually reluctant to install added materials in the interest of cost such that only the base safety measures are adhered to.

The authors also suggest the removal of fuel tanks from the crash zone of a vehicle. Manufacturers of bus body structures usually place the fuel tanks at extreme ends of the wheel base, so as to accommodate the luggage at the centre. This method is advantageous in terms of lowering the centre of gravity of the whole bus on load. However the fuel tank is now moved to areas near the crash zones of the bus structure. A more balanced decision criterion should be used in favor of fuel tank safety over luggage space

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