RV explosion due to pipe bursting

Case background:

A person was using propane gas to heat the stove for cooking in a recreational vehicle. The pipe leading to the stove had burst causing propane to leak over the recreational vehicle. As the person was a smoker when he went to light the cigarette the RV went into flames. The person was not injured but the RV was completely damaged.

Investigation:

Determine the root cause for the fire.

Results:

The RV was a trailer type vehicle. The propane tank was at the back and outside of the trailer. Examination of the RV indicated that fire fighter had come very rapidly and saved significant portions of the vehicle from burning. In fact a clear demarcation was present inside the RV where the bottom portion of the RV was charred while the top portion was relatively not charred.

Propane gas is heavier than air. It settles towards the bottom when it is leaked and very slowly diffuses into air.

Investigation of the propane delivery pipes in the RV indicated a location where the pie had burst. The delivery pipes were made of Cu alloy. This portion was carefully examined.

Another portion of the pipe was sectioned out for evaluation of metallurgical properties. Chemical and mechanical properties of the pipe were examined. The examination revealed lower than usual mechanical property of the alloy. Further investigation indicated the Cu pipe thickness was not to specification. The fracture surface revealed good ductile failure.

Conclusion:

The failure of the Cu pipe was to due to improper gauge thickness of the pipe.