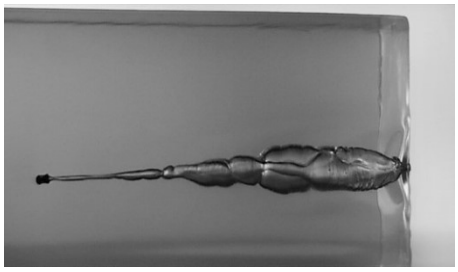
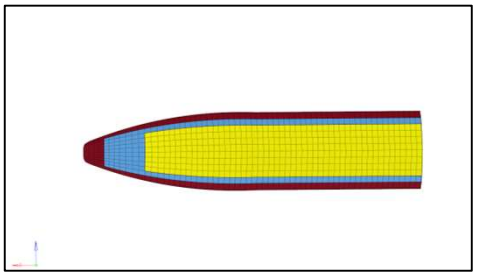
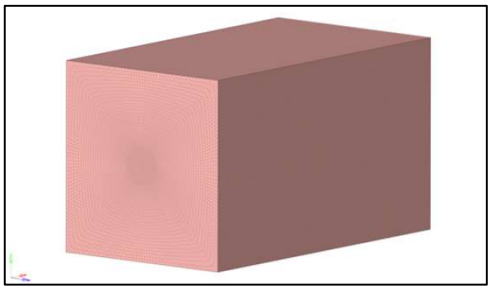
Domain: Defense
Case: Bullet Penetration in Ballistic Gelatin
Analysis: CAE



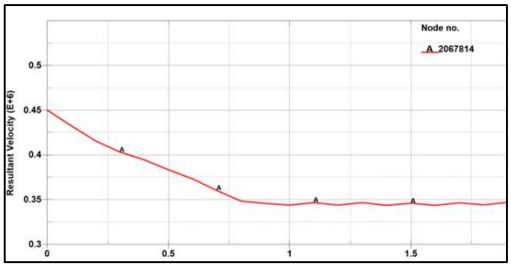
Bullet penetration in Ballistic Gel



FEA modelling of Bullet



FEA modelling of Gelatin block



Post-processing: Energy plot

Use of Ballistic Gelatin in Defense applications:

Ballistic Gelatin, also known as ordnance gel or ballistic block, came about as a scientific testing method to study the performance of projectiles once they reached their target. This sub-field of ballistics is called terminal ballistics and is very important in military, police, security and hunting.

To develop better projectiles, scientists and ballisticians developed ballistic gelatin to simulate targets and study bullet performance in a repeatable way.
Ballistic gelatin has been engineered to its specifications precisely because it closely mimics the behavior of muscle fibers in living creatures and can therefore tell us how a bullet will perform on a real hunt. The core of ammunition testing on ballistic gel is shooting at the block and studying the effects it had on the gel.

FEA can accurately reproduce the behavior of a lead round nose bullet in a ballistic gelatin test. The bullet should enter the block and tumble slightly until coming to a complete stop within the block. Depending on the velocity used, the bullet should fragment accordingly.

So in summary, the ballistic gelatin is

- Used to study the terminal ballistics of ammunition
- Made of gelatin that mimics biological tissue
- A good tool to evaluate bullet characteristics & performance

Result interpretation & Physics:

Kinetic energy is greatest at the moment of impact. It decreases throughout the simulation because the energy is being absorbed until the bullet stops. The internal energy increases over time and once it reaches its maximum. This is due to energy absorption. The greatest amount of energy is absorbed when the forces of the block stops the bullet. This can be contributed to Newton's third law. The block applies a retarding force to the bullet and the bullet applies an equal and opposite force on the block and ultimately transfers energy.