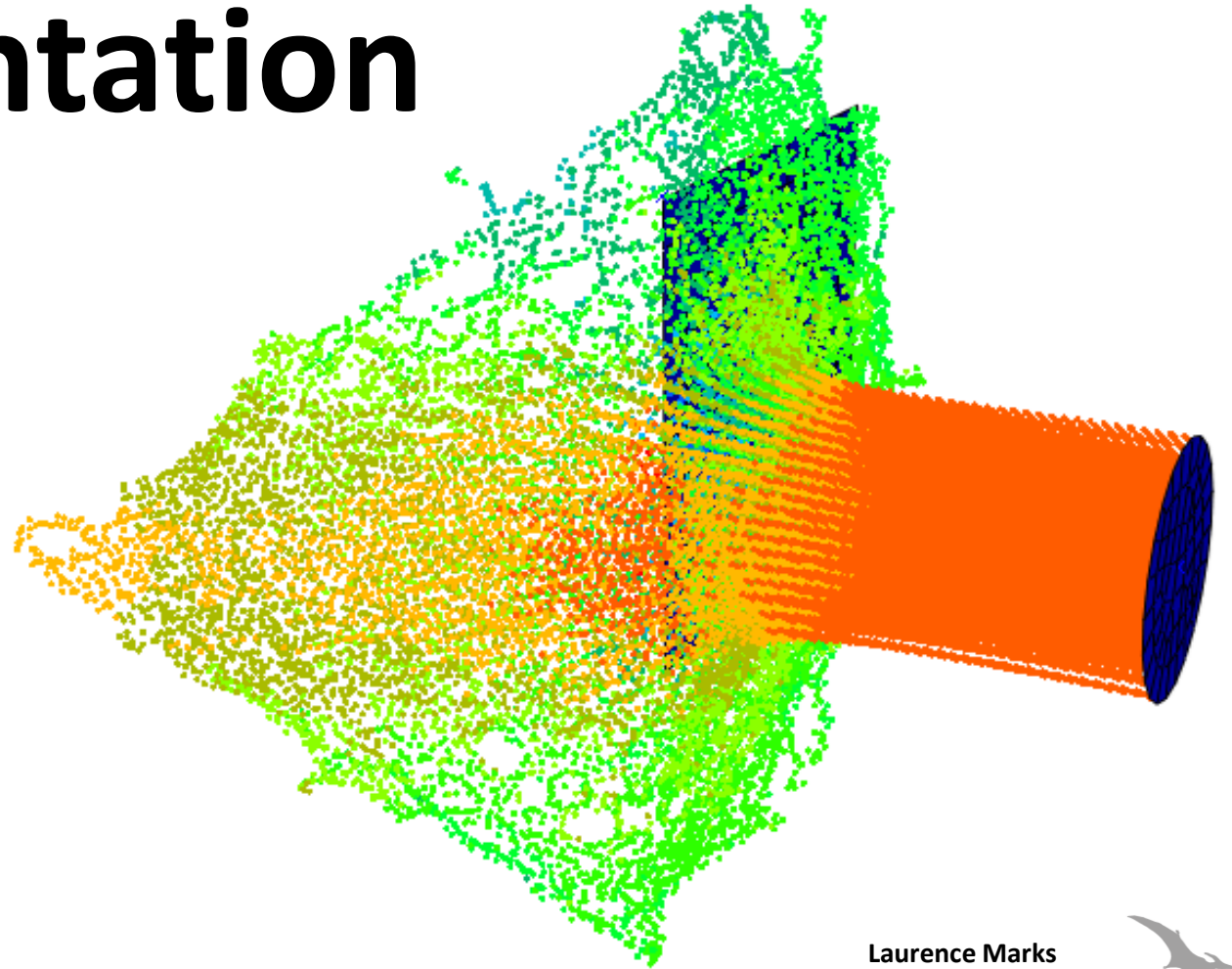
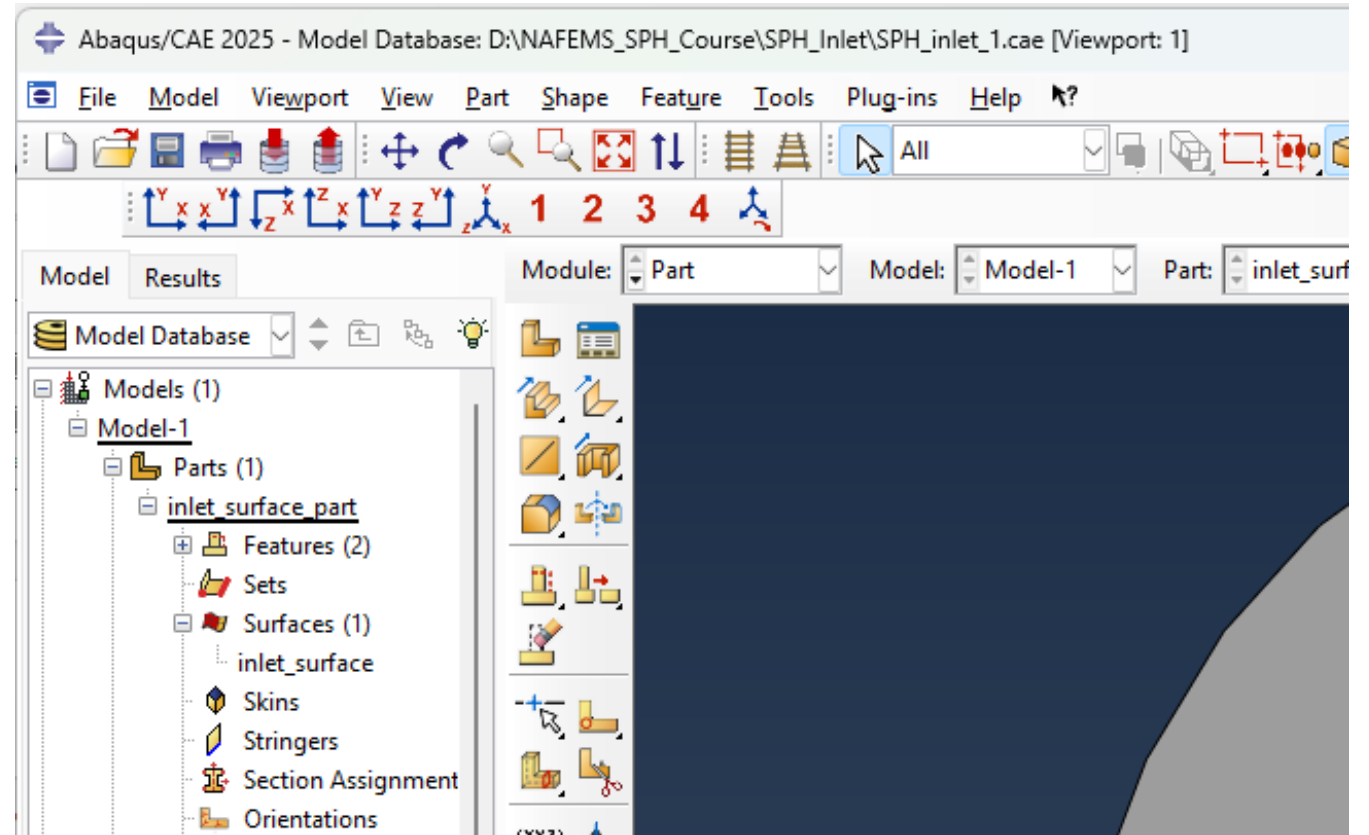
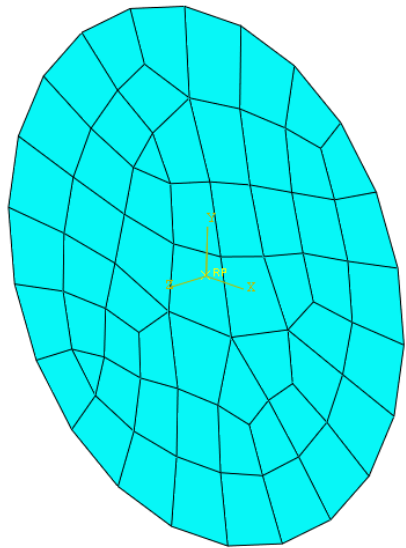


SPH Inlet Definition – enhanced presentation



CAE model definition

- Material defined in CAE model. Gravity too.
- Part – inlet_surface_part
- Surface in part – inlet_surface



Steps in editing the inp file..

- Define the particle generator in the part. Its name is SPH_INLET
- Surface is inlet_surface which is in the part so doesn't need any more description.

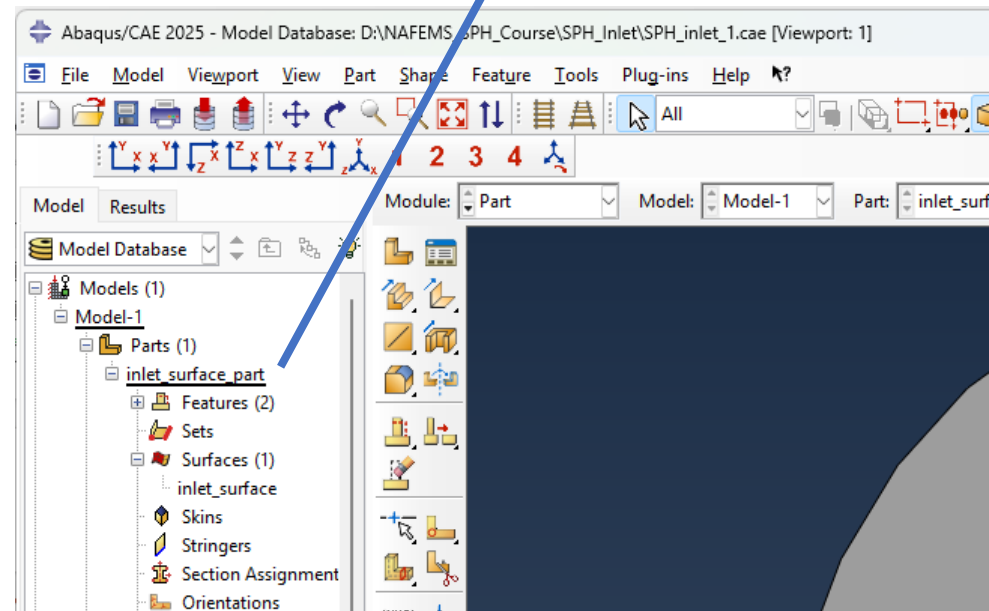
```
*PARTICLE GENERATOR, NAME=SPH_INLET, TYPE=PC3D,  
MAXIMUM NUMBER OF PARTICLES=100000  
**  
*PARTICLE GENERATOR INLET, SURFACE=inlet_surface  
**  
*PARTICLE GENERATOR MIXTURE  
SPH_INLET,  
**  
*SOLID SECTION, ELSET=SPH_INLET, MATERIAL=WATER  
0.025,  
*End Part
```



Steps in editing the inp file..

- Define the particle surface in the assembly section.
- Remember particle generator needs to be referenced with the part name.

```
eiset=inlet_surface_part-1.inlet_surt  
**  
**Create particle surface  
*SURFACE, NAME=PARTICLE_SURFACE  
inlet_surface_part-1.SPH_INLET,  
*End Assembly  
**  
** MATERIALS
```



Steps in editing the inp file..

- Add interaction properties and amplitudes. Only flow speed seems to work.

```
** INTERACTION PROPERTIES
**
*Surface Interaction, name=fluid_fluid
*Friction
0.,
*Surface Behavior, pressure-overclosure=HARD
**
*AMPLITUDE, name=particle_flow_speed
0.0, 20
10.0, 20
*AMPLITUDE, name=mass_flow_rate
0., 1
0.9, 1
1.0, 1
10.0, 1
```



Steps in editing the inp file..

- How the particle generator flows is defined in the step
- We must have interactions present in the step, as shown.

```
**  
** STEP: Step-1  
**  
*Step, name=Step-1, nlgeom=YES  
*Dynamic, Explicit  
, 0.5  
*Bulk Viscosity  
0.06, 1.2  
**  
*PARTICLE GENERATOR FLOW, GENERATOR=inlet_surface_part-1.SPH_INLET, DEFINITION=SPEED  
particle_flow_speed, mass_flow_rate  
**  
** BOUNDARY CONDITIONS  
**  
** Name: BC-1 Type: Displacement/Rotation
```

```
** INTERACTIONS  
**  
*Contact, op=NEW  
*Contact Inclusions  
PARTICLE_SURFACE, PARTICLE_SURFACE  
*Contact Property Assignment  
PARTICLE_SURFACE, PARTICLE_SURFACE, fluid_fluid  
** OUTPUT REQUESTS
```



Run from command line

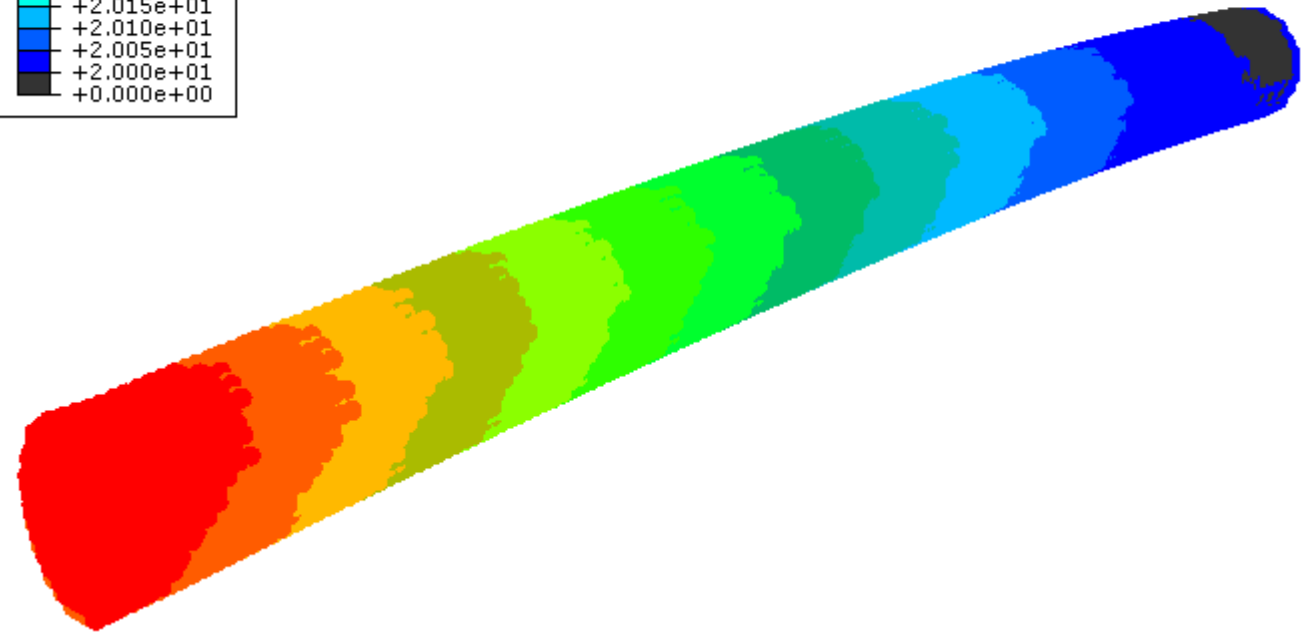
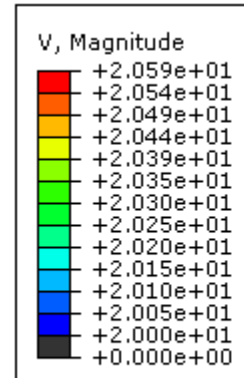
- Needs to run from the command line obvs.

```
D:\NAFEMS_SPH_Course\SPH_Inlet>abq2025 -j sph_i_2 int
Old job files exist. Overwrite? (y/n): y
Analysis initiated from SIMULIA established products
Abaqus JOB sph_i_2
```



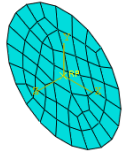
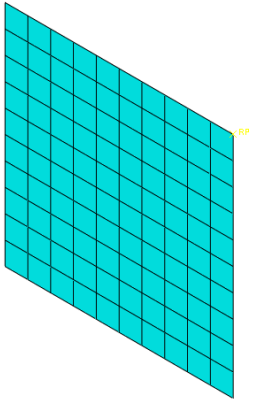
Initial Results

- SPH particles leave the inlet surface at the defined velocity.



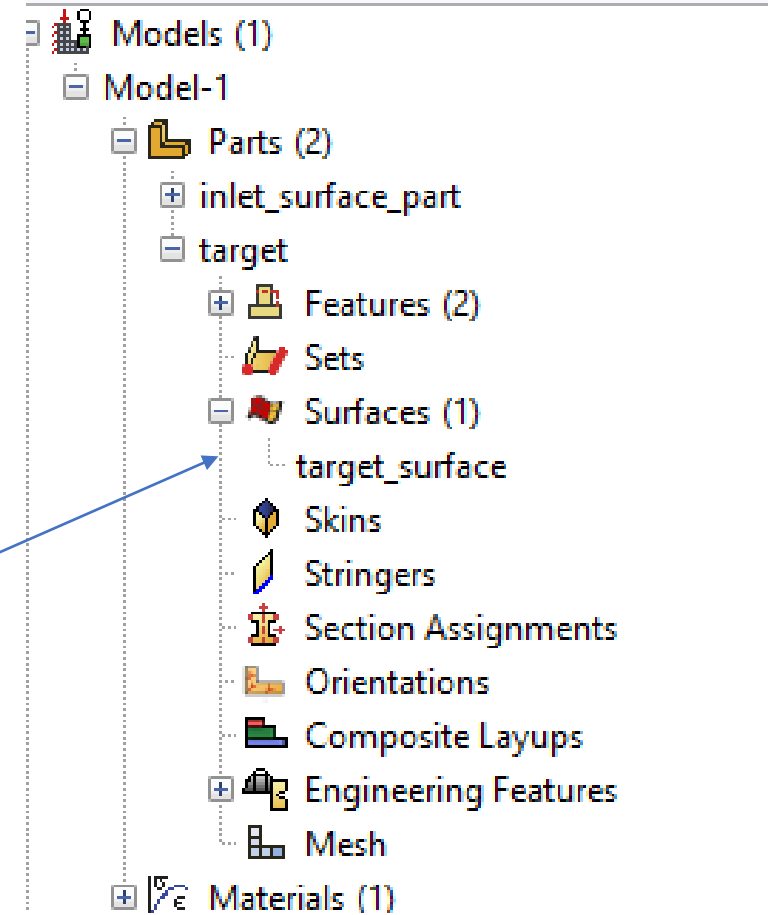
We'll add a target now..

- It's a discrete rigid surface. Make sure there is a surface defined at part level to work in the contact definition.



```
** INTERACTIONS
**
*Contact, op=NEW
*Contact Inclusions
PARTICLE_SURFACE, PARTICLE_SURFACE
PARTICLE_SURFACE, target-1.target_surface
*Contact Property Assignment
PARTICLE_SURFACE, PARTICLE_SURFACE, fluid_fluid
PARTICLE_SURFACE, target-1.target_surface, solid_fluid
**
```

```
** INTERACTION PROPERTIES
**
*Surface Interaction, name=fluid_fluid
*Friction
0.,
*Surface Behavior, pressure-overclosure=HARD
**
*Surface Interaction, name=solid_fluid
*Friction
0.,
*Surface Behavior, pressure-overclosure=HARD
**
```



Results from target example

- Seems to work OK..

