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## Activities:

Nuova Teknocam was born in 1992 as CAD design office and CAM defining process in automotive field.

Over the years, the skills have evolved and now the main activities consist of:

- **FEASIBILITY, VALIDATION, VIRTUAL TRY-OUT (Of whole cycle, compensation to match tolerances and final test on gauge without clamps)**
- **HAMMING SIMULATIONS**

## About us:

The company is a firm of professionals including n° 8 specialists in the field of sheet metal and other external workers.

## Software used

- **Cad 2D/3D, compensation**
- **Solver**



## MORPHING: match of tolerances

Distance between objects (numerical)



Errors after springback with deformed shapes on gauge without clamps

MAX 6 mm

Errors after springback with non-deformed shapes on gauge without clamps

Blu teorical  
Red deformed

MAX 1 mm

MAX 5 mm

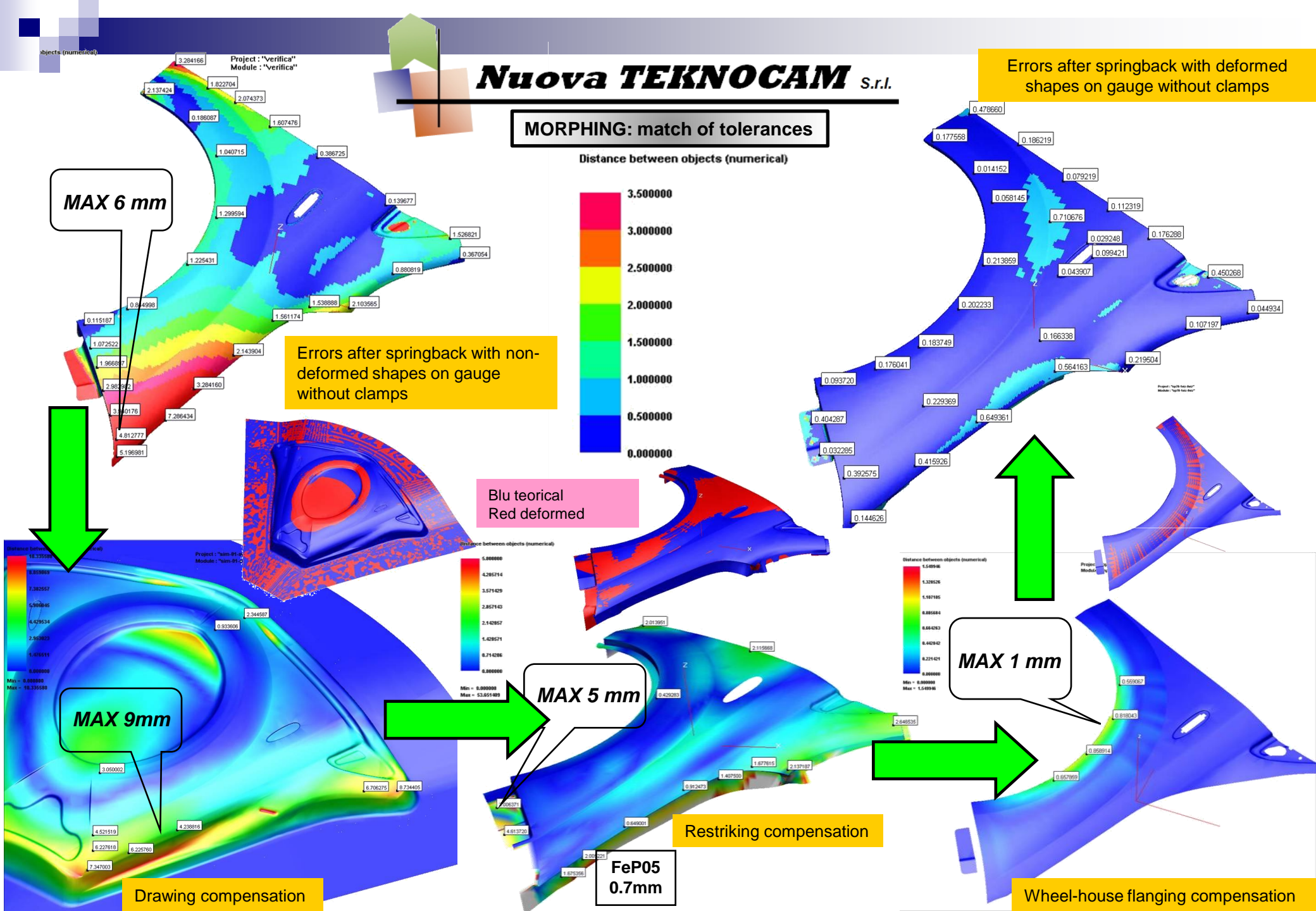
Restriking compensation

FeP05  
0.7mm

Wheel-house flanging compensation

Drawing compensation

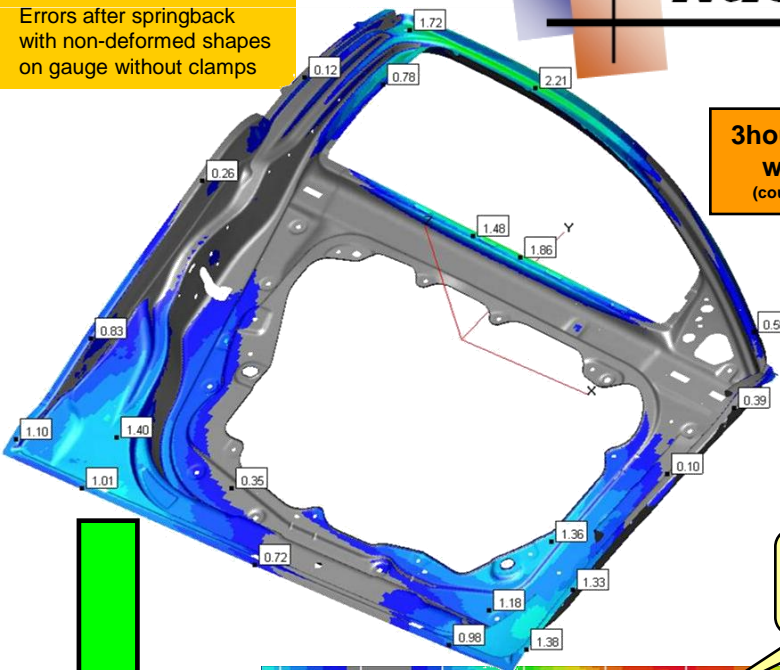
MAX 9mm



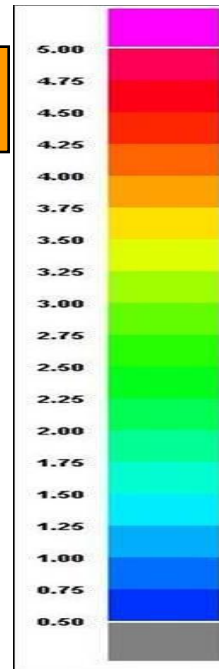


# Nuova TEKNOCAM S.r.l.

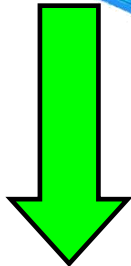
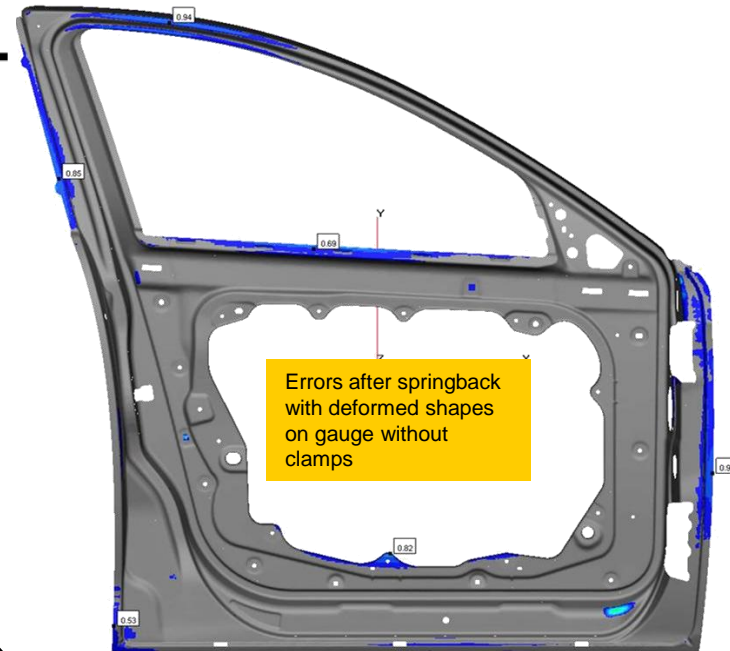
Errors after springback  
with non-deformed shapes  
on gauge without clamps



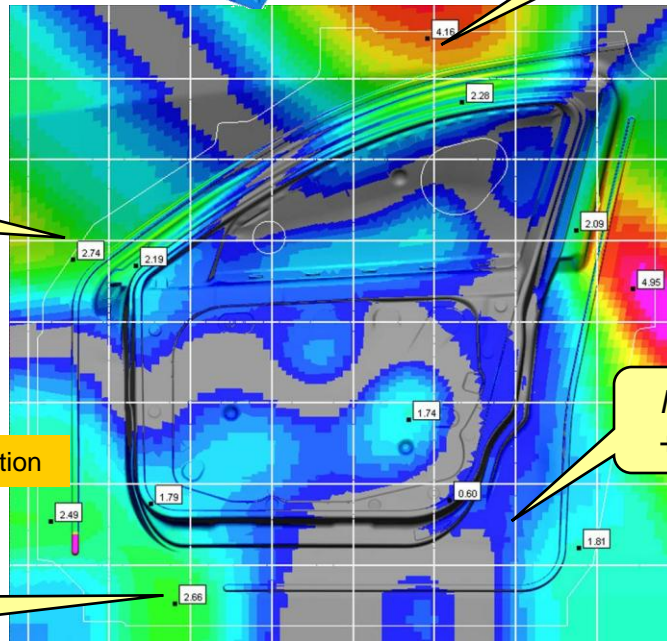
3hours under press  
without cracks  
(coupling blank holder-die)



Errors after springback  
with deformed shapes  
on gauge without  
clamps



Max  
+2.5

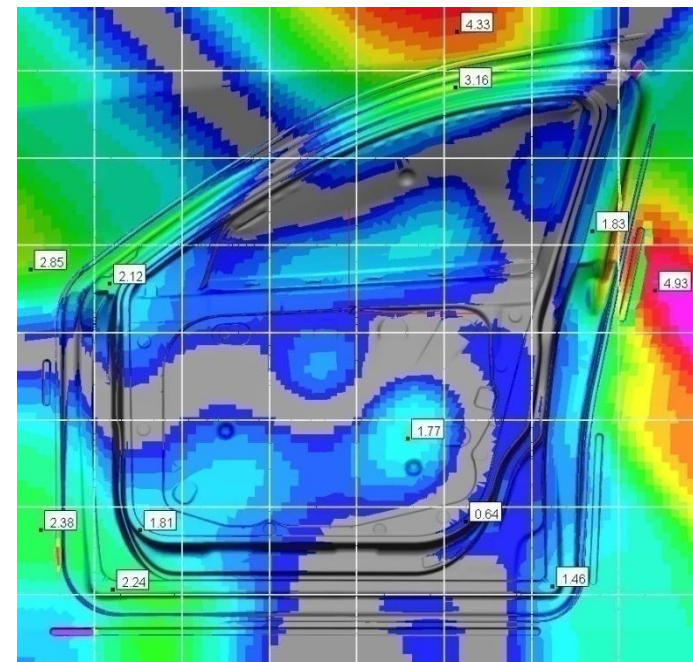
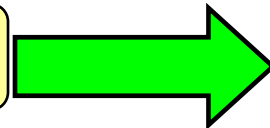


Max  
-4.0

1° drawing compensation  
same as 2° drawing

Max  
+1.8

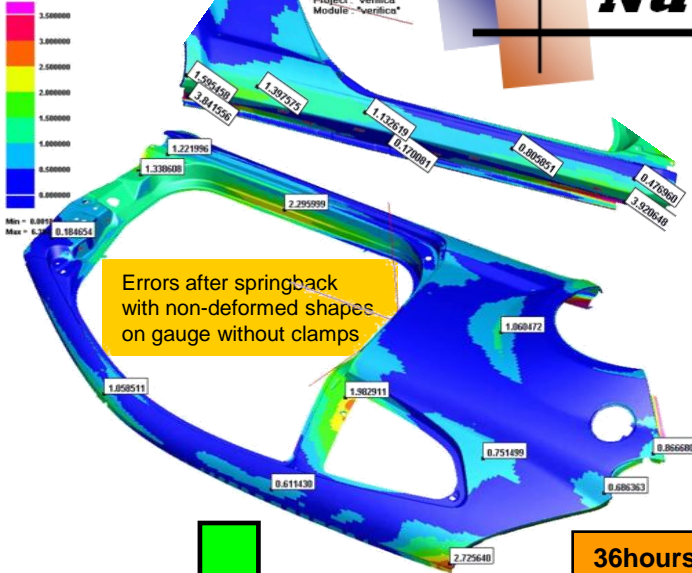
FeP05  
0.7mm



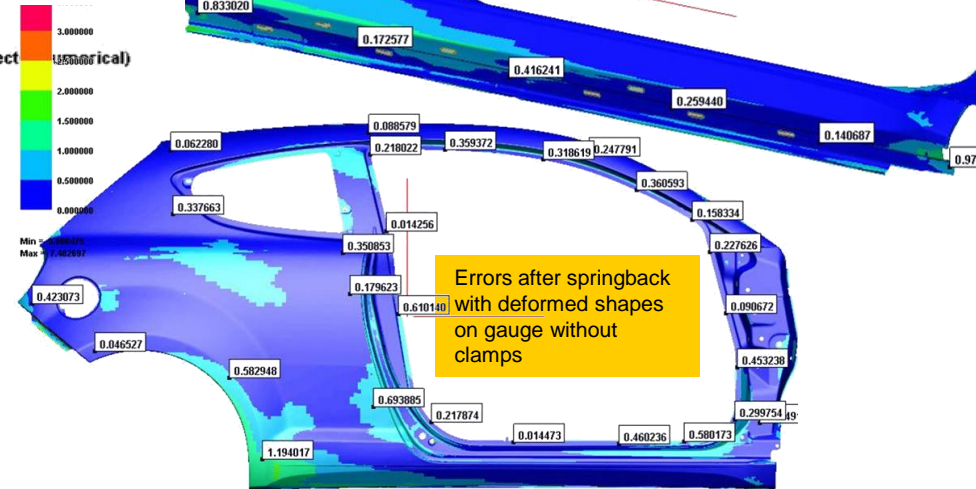
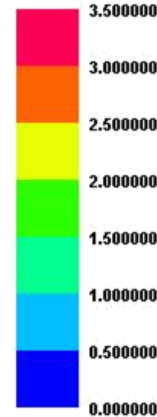
# Nuova TEKNOCAM S.r.l.

MORPHING: match of tolerances

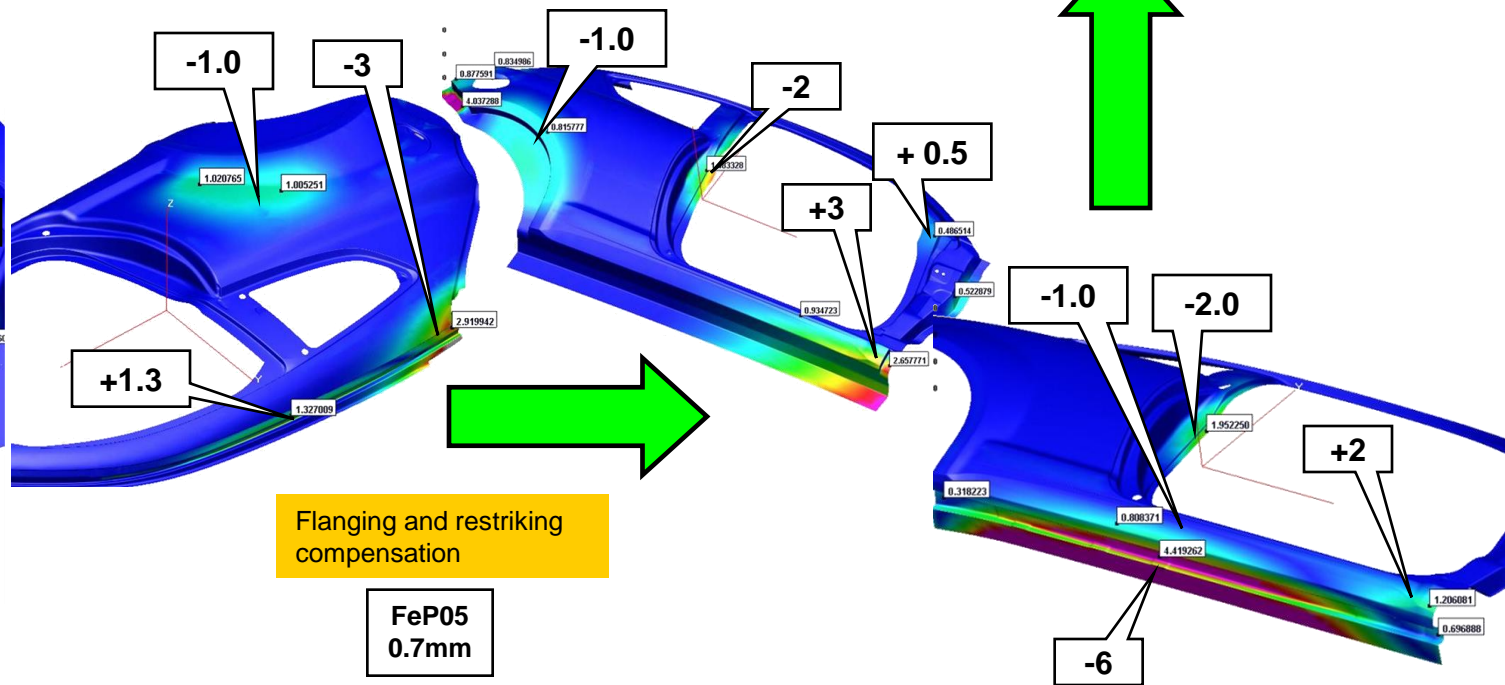
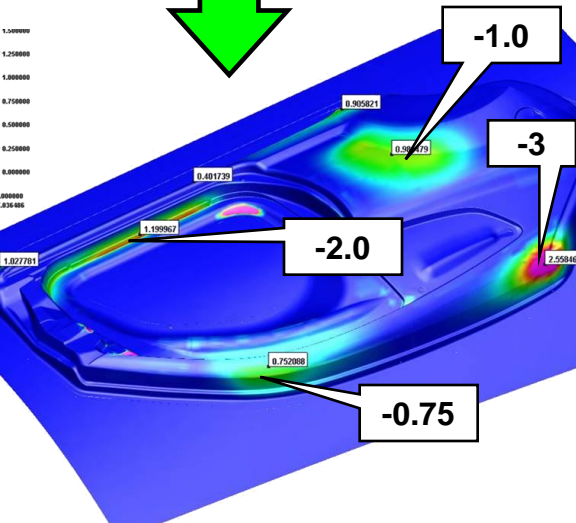
Distance between objects (numerical)



Distance between object (numerical)



36hours under press without cracks



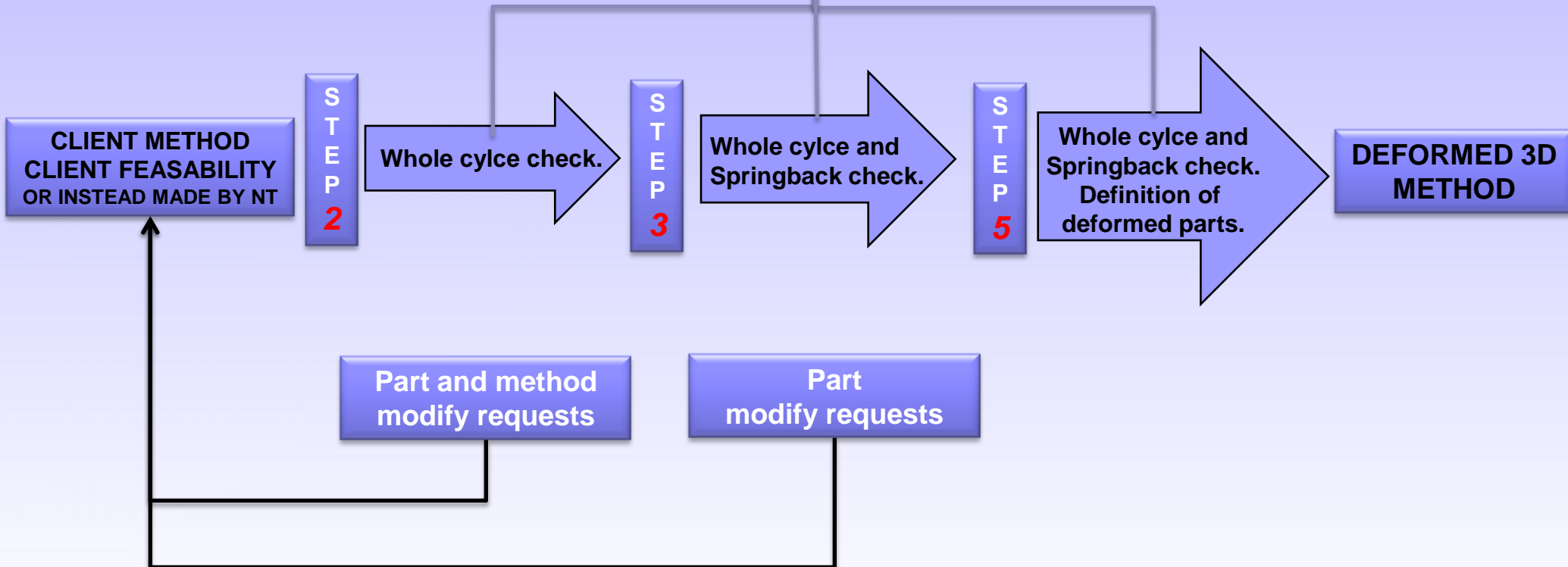
FeP05  
0.7mm

# NT USUAL WORKING METHOD FULL CYCLE SIMULATION

## BASED ON FIAT USUAL EMISSION OF PARTS:

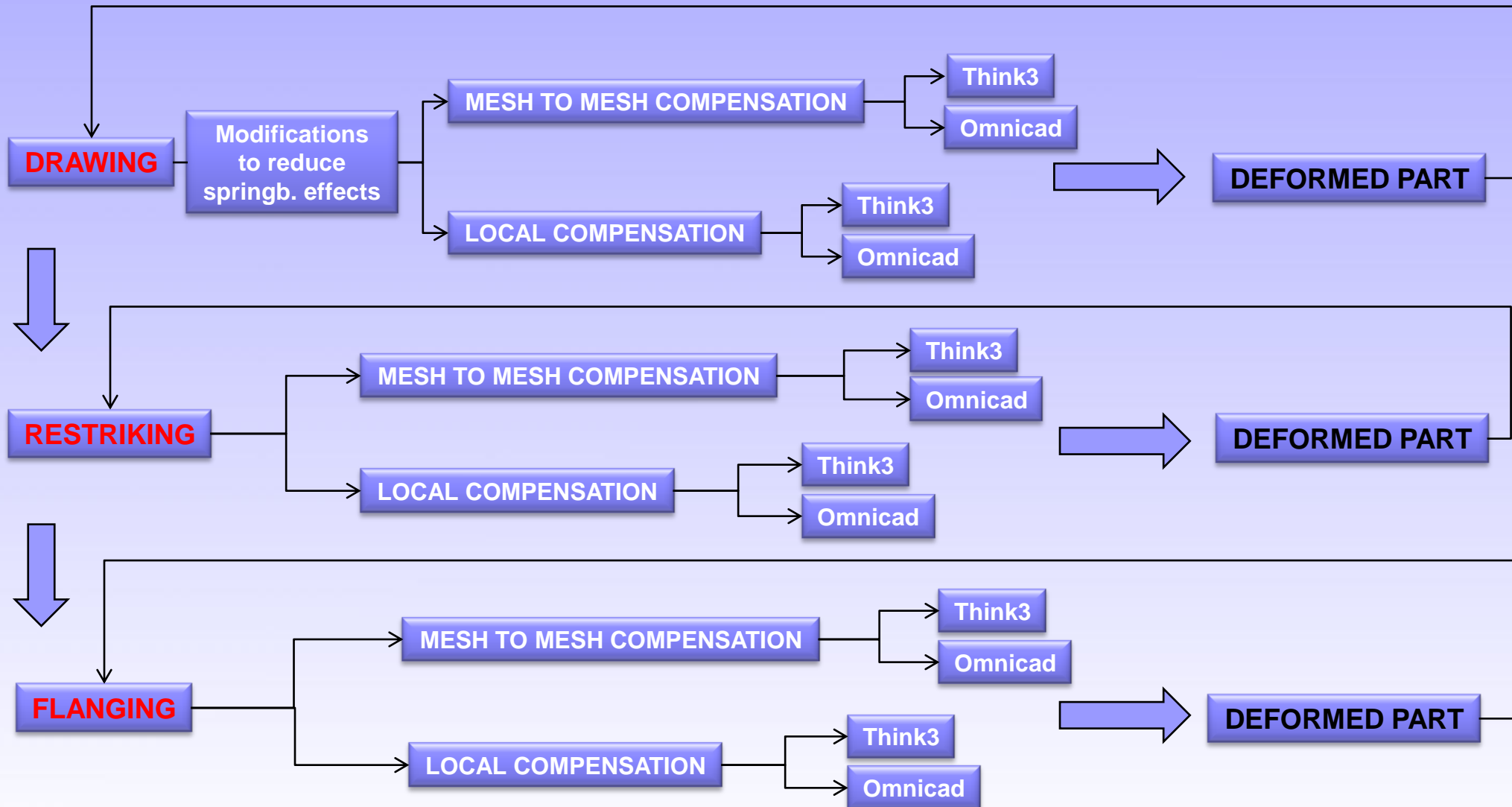
- STEP1: not visible
- STEP2: feasibility
- STEP3: validation
- STEP4: not visible
- STEP5: compensation and milling

**NT need to dialogue  
with  
PM and WS tune up** **!**



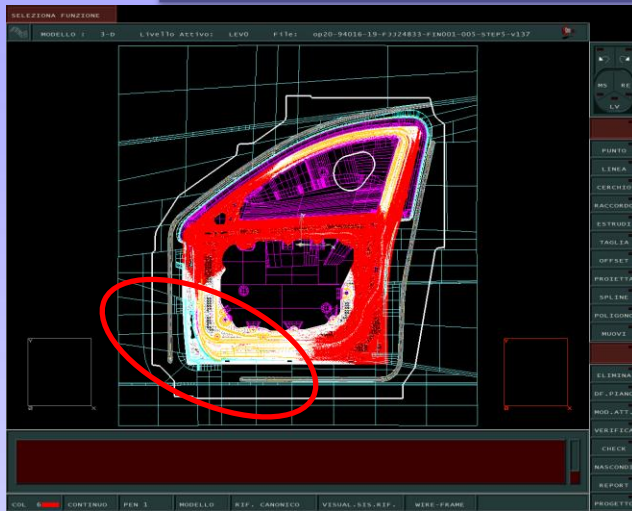


## SIMULATION, SPRINGBACK AND PART GRAVITY ON GAUGE PART DEFORMATION ANALYSIS

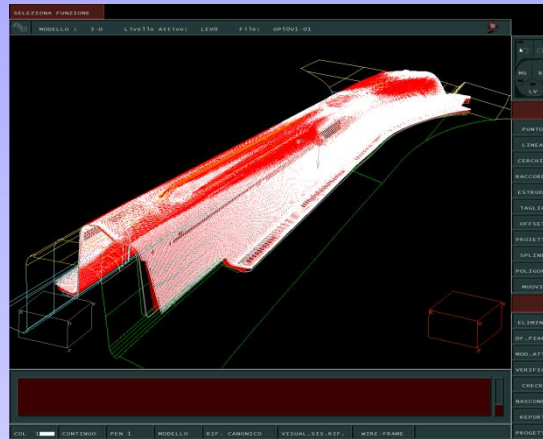


# NT DEFORMATION METHOD EXAMPLES

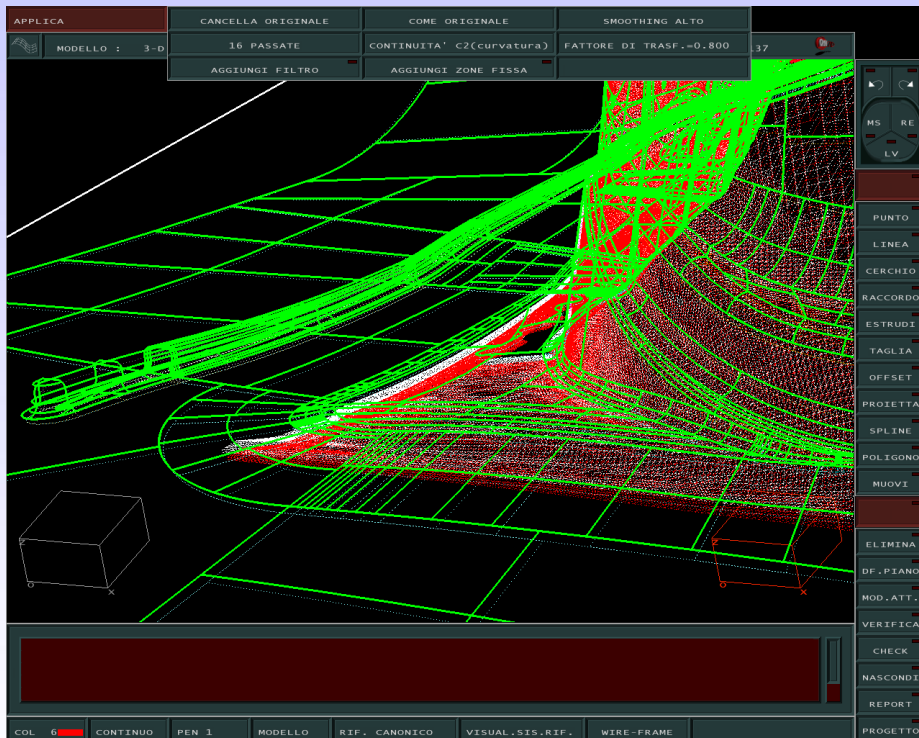
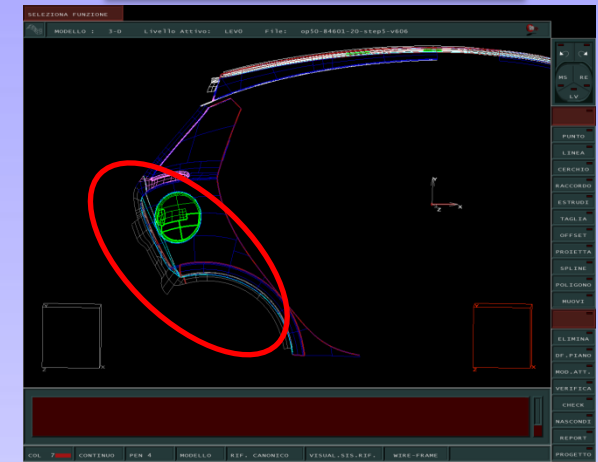
## MESH TO MESH COMPENSATION



## OMNICAD



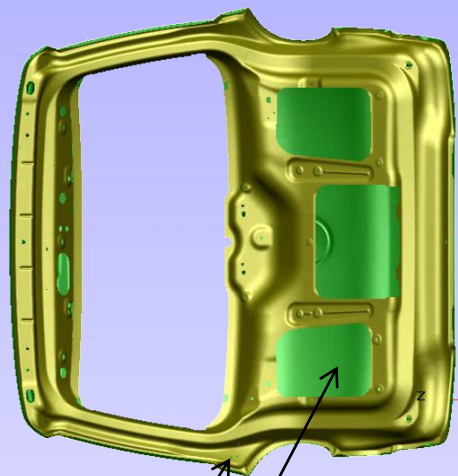
## LOCAL COMPENSATION







**TABLE-TOP HEMMING**



Inner tailgate

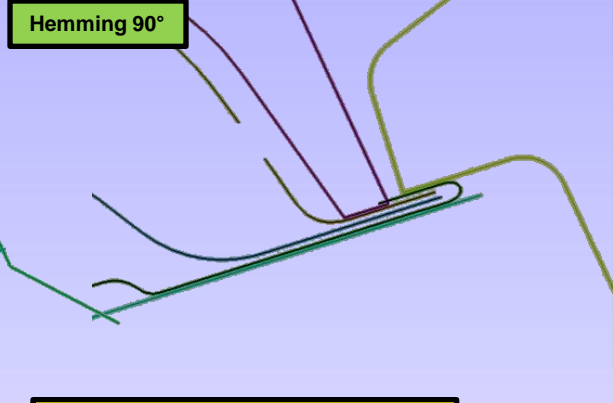
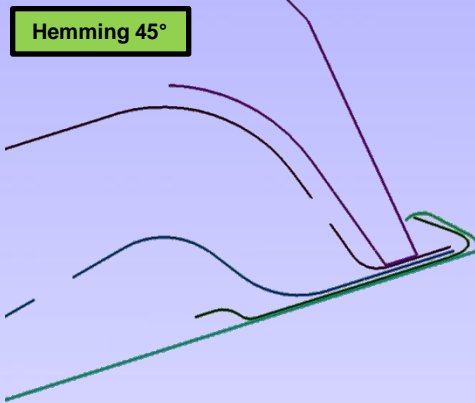
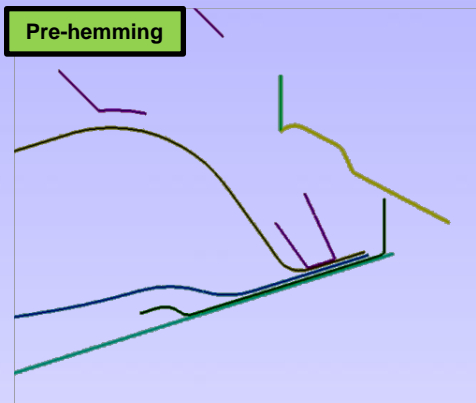
Outer tailgate

**HEMMING: assembly simulation**

Pre-hemming

Hemming 45°

Hemming 90°



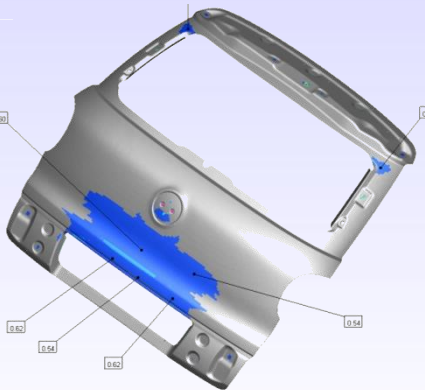
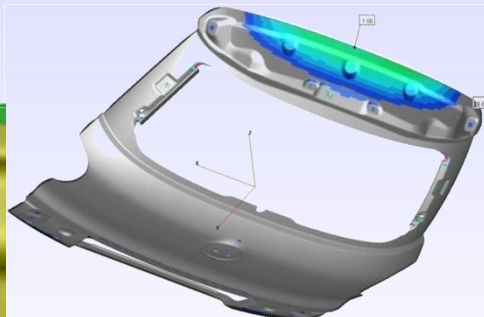
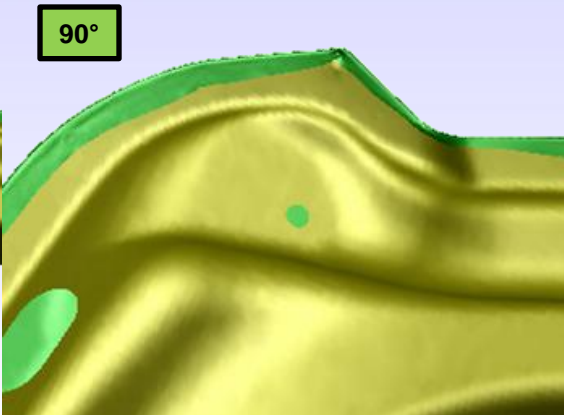
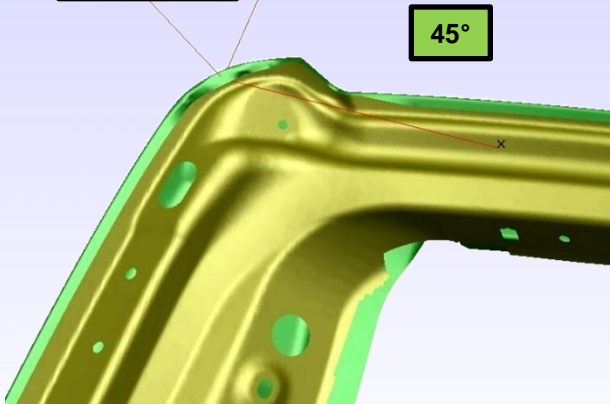
**SPRINGBACK ANALYSIS**

Single element error

Assembly error

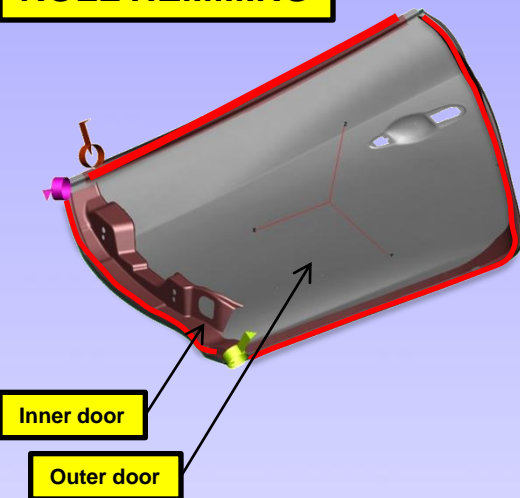
45°

90°

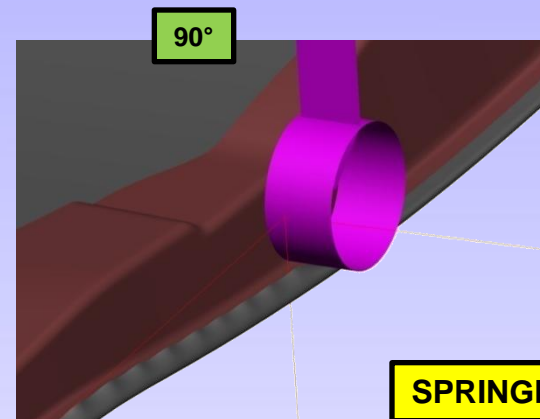
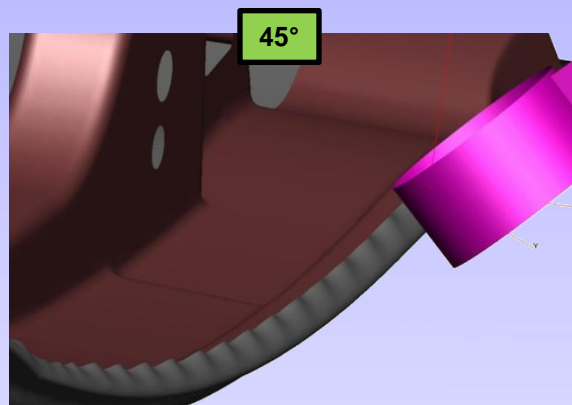


**Single element morph is necessary?**

## ROLL HEMMING

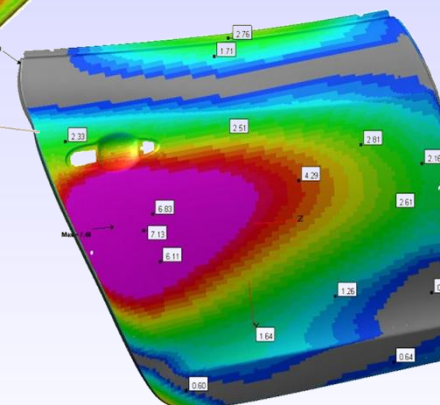


## HEMMING: assembly simulation

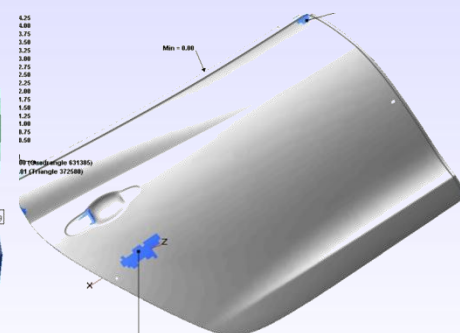


## SPRINGBACK ANALYSIS

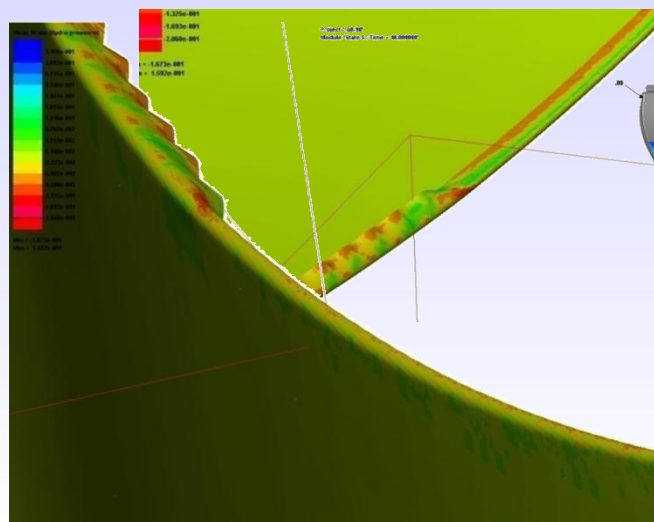
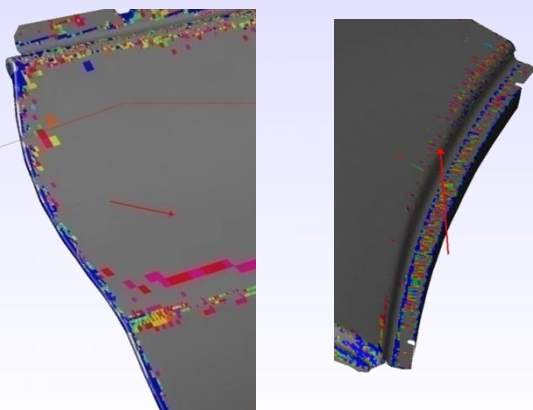
### Single element error



## Assembly error



## SURFACE DEFECTS ANALYSIS



### Single element morph is necessary?

HEMMING: assembly simulation

CORRISPONDENCE WITH REAL WORLD

