

## #1348: OptiStruct – Equivalent Plastic Strain Response for optimization

**Product:** OptiStruct

**Product Version:** OptiStruct 2017.2.3 or above

### Topic Objective

Equivalent plastic strain response for optimization with OptiStruct.

### Topic Detail

Equivalent plastic strain can be used as an internal response when a nonlinear response optimization is run using the equivalent static load method. This is made possible through the use of an approximated correlation between linear strain and plastic strain, which are calculated in the inner and outer loops respectively, of the ESL method.

- Now, Equivalent Plastic Strain is available as response for optimization
- The design variables have to be shape variables, it is currently ONLY supported for shape optimization
- The analysis has to be small displacement, NLSTAT analysis
- This response is currently supported only for solid elements
- Equivalent plastic strain response for shell elements is in plan for the near future
- The response is supported for both SMP and DDM

To ensure that plastic strains remain under a certain level, it is best to define equivalent plastic strain constraint (instead of objective) in the optimization problem

In out file		RETAINED RESPONSES TABLE						
1	MASS	mass	--	--	TOTL	1.359E-04	MIN	
2	DISPL	disp	1	2980	TXYZ	5.202E-02	<	5.200E-02 0.0 A
3	STRAI	pstrain	2	2259	PLAS	1.006E-02	<	2.000E-02 0.0
3	STRAI	pstrain	2	3079	PLAS	1.006E-02	<	2.000E-02 0.0
3	STRAI	pstrain	2	3899	PLAS	1.006E-02	<	2.000E-02 0.0
3	STRAI	pstrain	2	4719	PLAS	1.006E-02	<	2.000E-02 0.0

#### Optimization Problem set up:

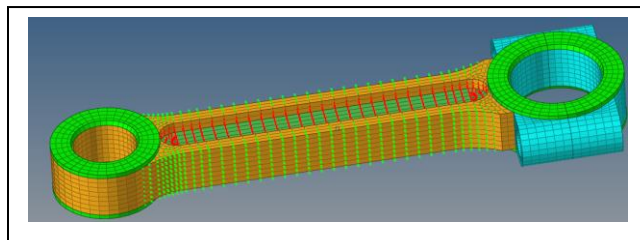
Design variables: Shapes (2)

Objective: Minimize Mass

Constraints:

Subject to Displacement Constraint

Equivalent Plastic Strain Constraint 2%



Equivalent Plastic Strain Response

