

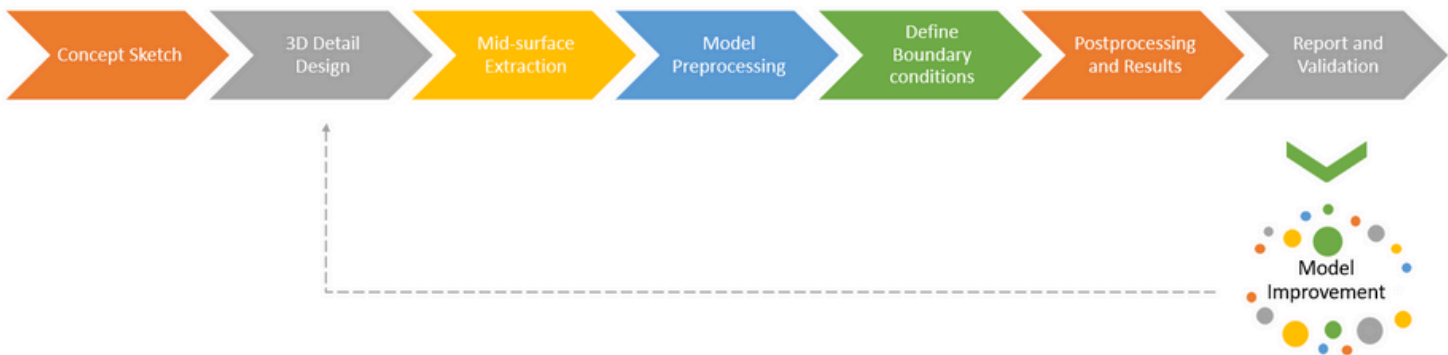
# PROJECT OVERVIEW

## DESIGN AND FINITE ELEMENT ANALYSIS OF A RACING BICYCLE FRAME

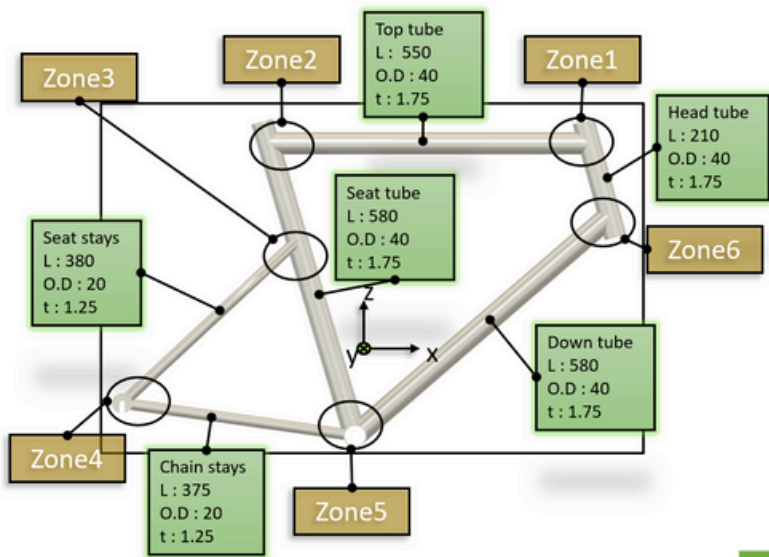
### PROJECT OBJECTIVE

- Design an ISO 4210-compliant bicycle frame, emphasizing efficiency & lightweight construction.
- Ensure manufacturability & cost-effectiveness while prioritizing rider comfort and safety.

### PROCESS OVERVIEW



### DESIGN AND CROSS - SECTION



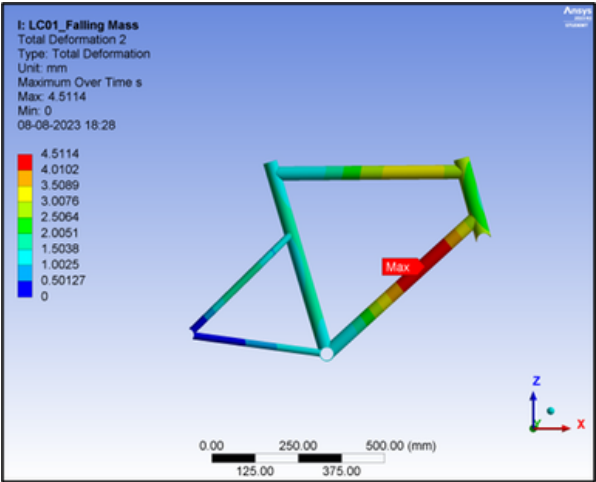
**Rod cross section overview – “Circle”**  
**Advantages:**  
1. Uniform strength and stiffness along all axes.  
2. Good balance of performance and weight.

### STRENGTH REQUIREMENTS:

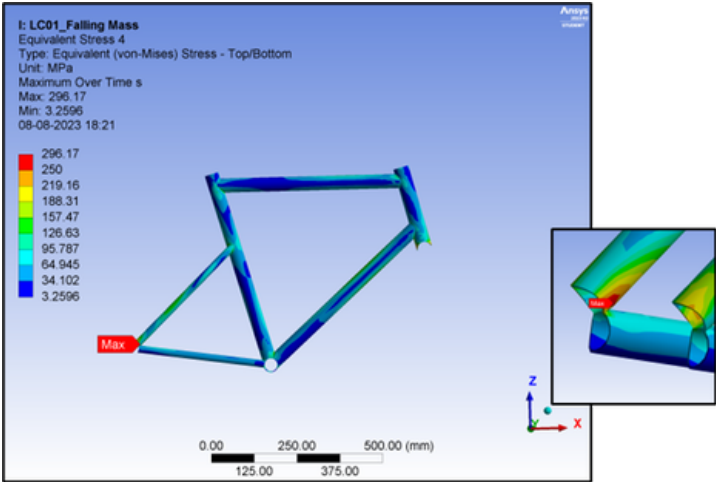
Load Case	Description
1	Impact testing - Falling Mass
2	Shock testing - Falling Frame
3	Dynamic testing with Pedaling Forces
4	Dynamic testing with Vertical Forces
5	Dynamic testing with Horizontal Forces

# FINITE ELEMENT METHODS

## LOAD CASE: IMPACT TESTING - FALLING MASS

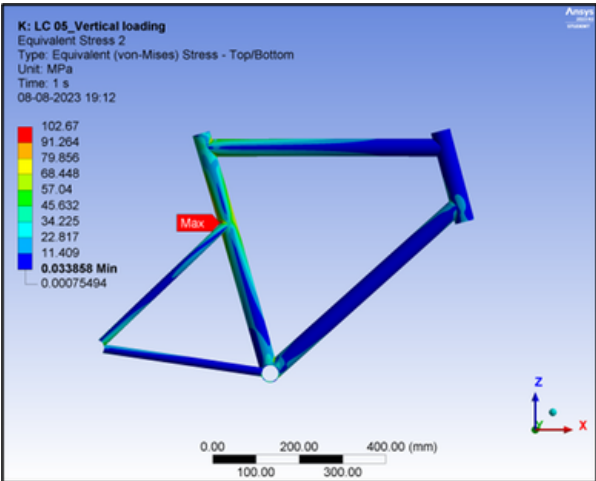


TOTAL DEFORMATION

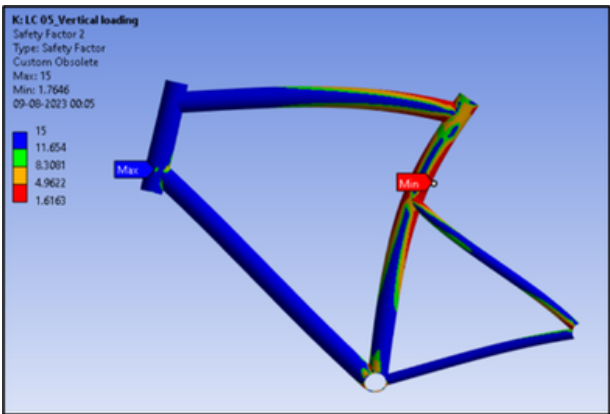


EQUIVALENT STRESS

## LOAD CASE: FATIGUE LOAD – DYNAMIC TESTING WITH VERTICAL FORCES

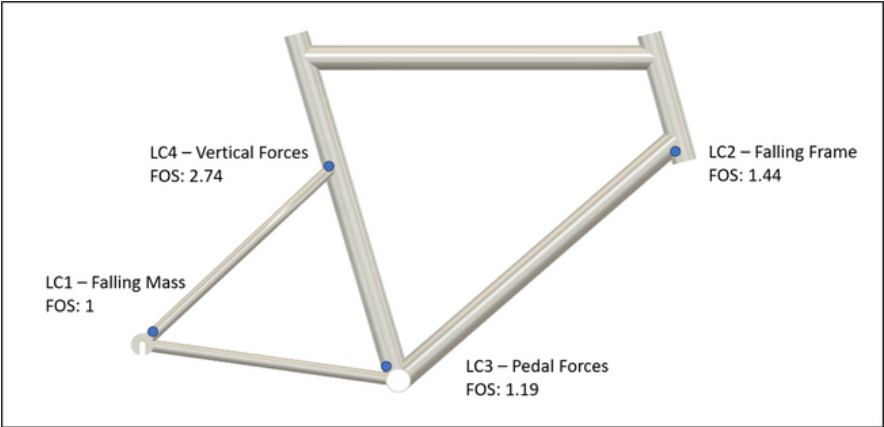


EQUIVALENT STRESS



SAFETY FACTOR

## ANALYSIS SUMMARY



● Indicates critical regions