Supplementary material to

RELIABILITY-BASED DESIGN OPTIMIZATION OF SCREW SHAFT FOR CONTINUOUS HIGH-PRESSURE HYDROTHERMAL CO-LIQUEFACTION PROCESS

Chitra Devi Venkatachalam[1*], Premkumar Bhuvaneshwaran[1], Mothil Sengottian[2], Sathish Raam Ravichandran[2]

[1]Department of Food Technology, Kongu Engineering College, Perundurai, Tamil Nadu - 638060
[2]Department of Chemical Engineering, Kongu Engineering College, Perundurai, Tamil Nadu - 638060
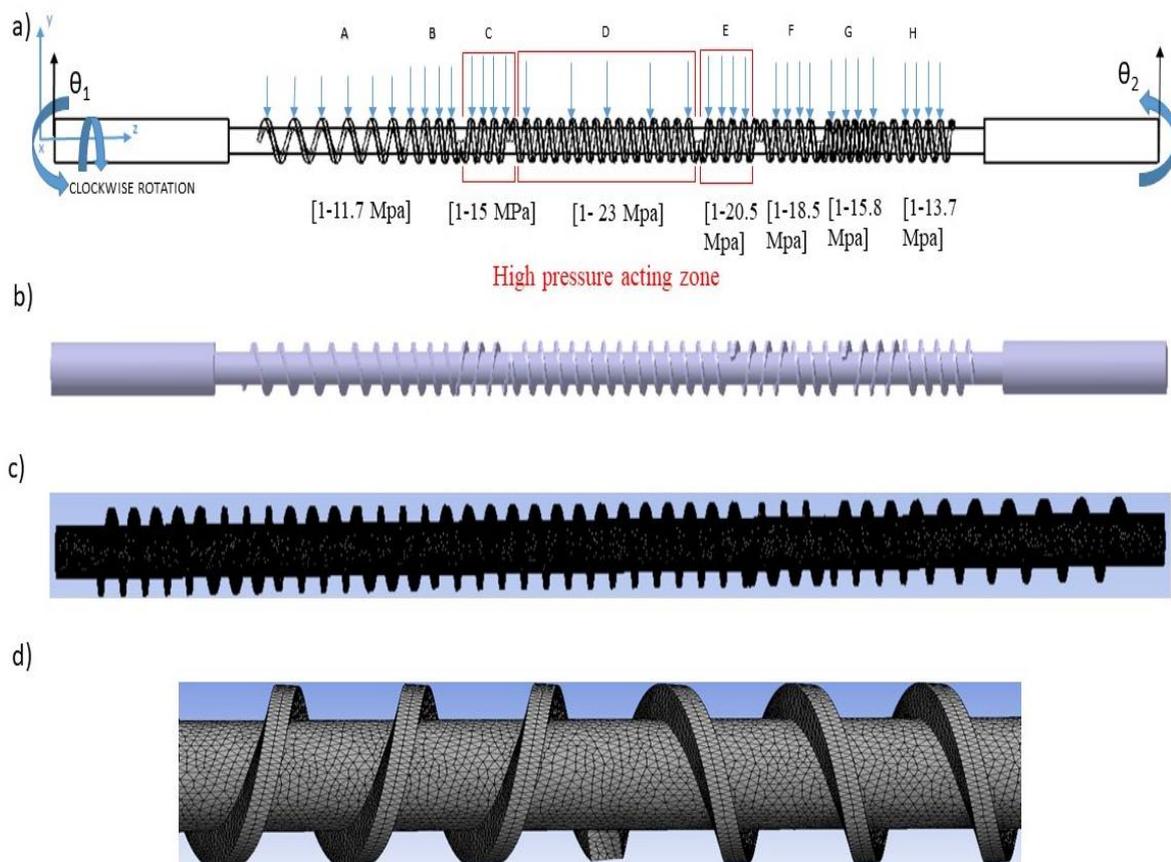
Figure S1. Different representation of screw shaft (a) 2-D schematic diagram of screw shaft; (b) 3-D model of screw shaft; (c, d) Discretization (Triangular mesh) of screw shaft by using Finite element method.
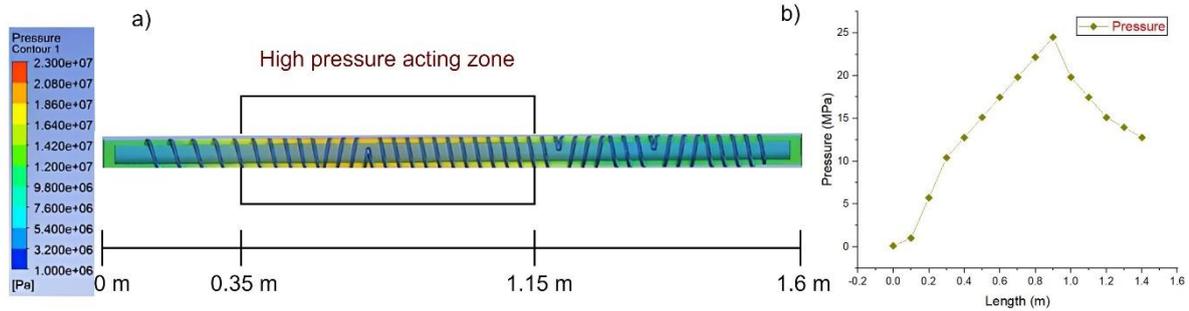
*Email: erchitrasuresh@gmail.com

Figure S2. (a) Pressure contour plot and b) pressure profile for screw shaft enclosed reaction chamber during high-pressure fluid flow.
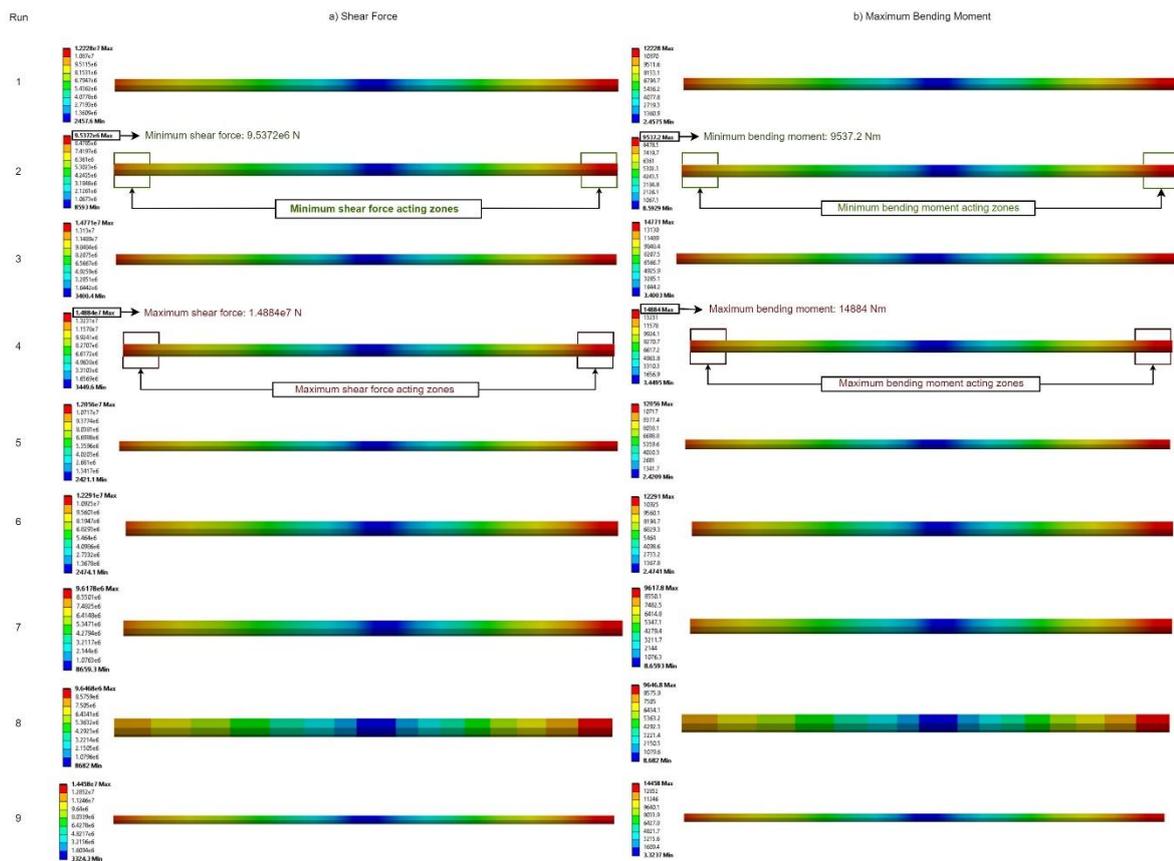

Figure S3. Contour plot about (a) shear force in Newton; (b) maximum bending moment in Nm for the beam with a different cross-section of Taguchi's model.
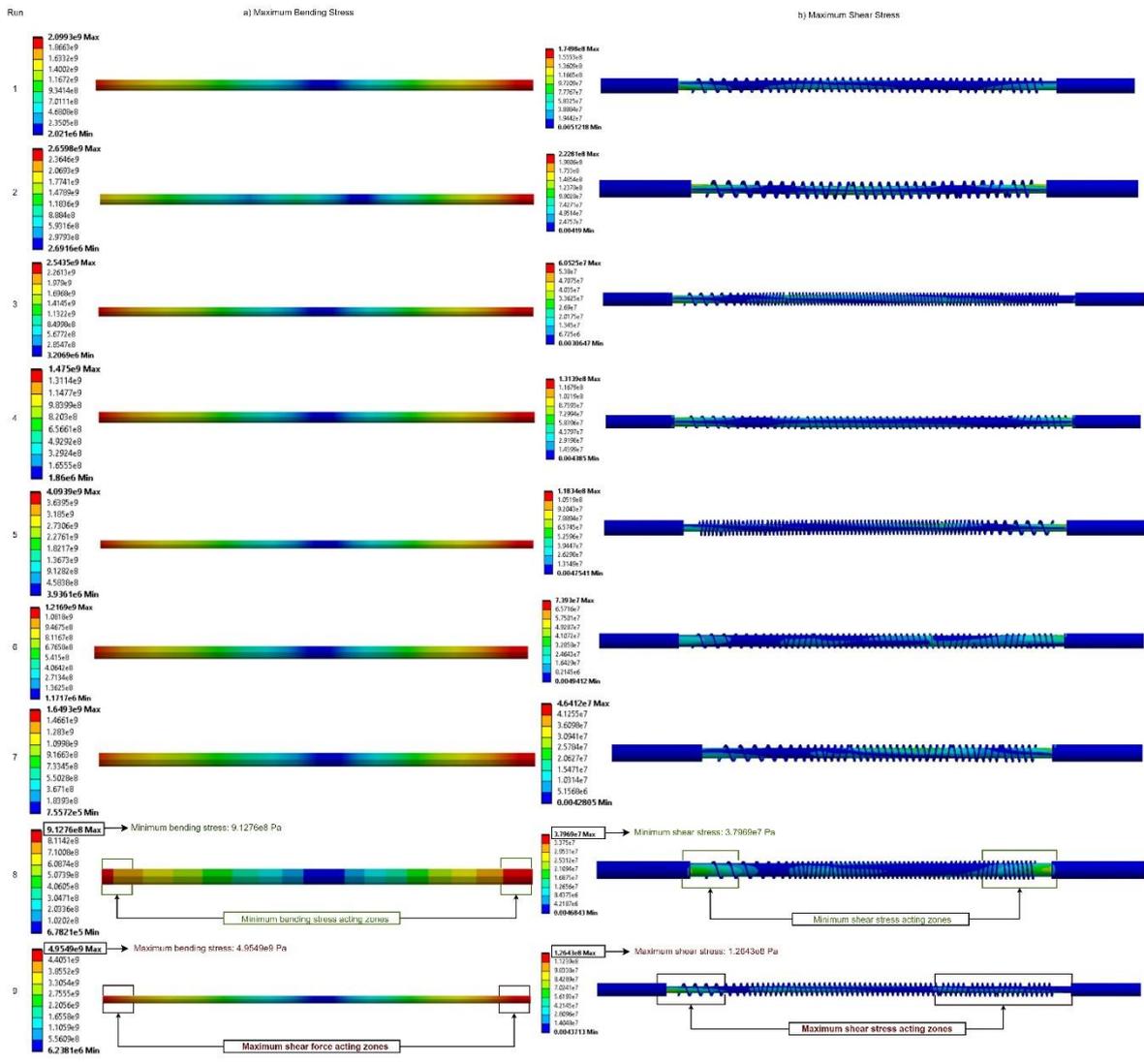
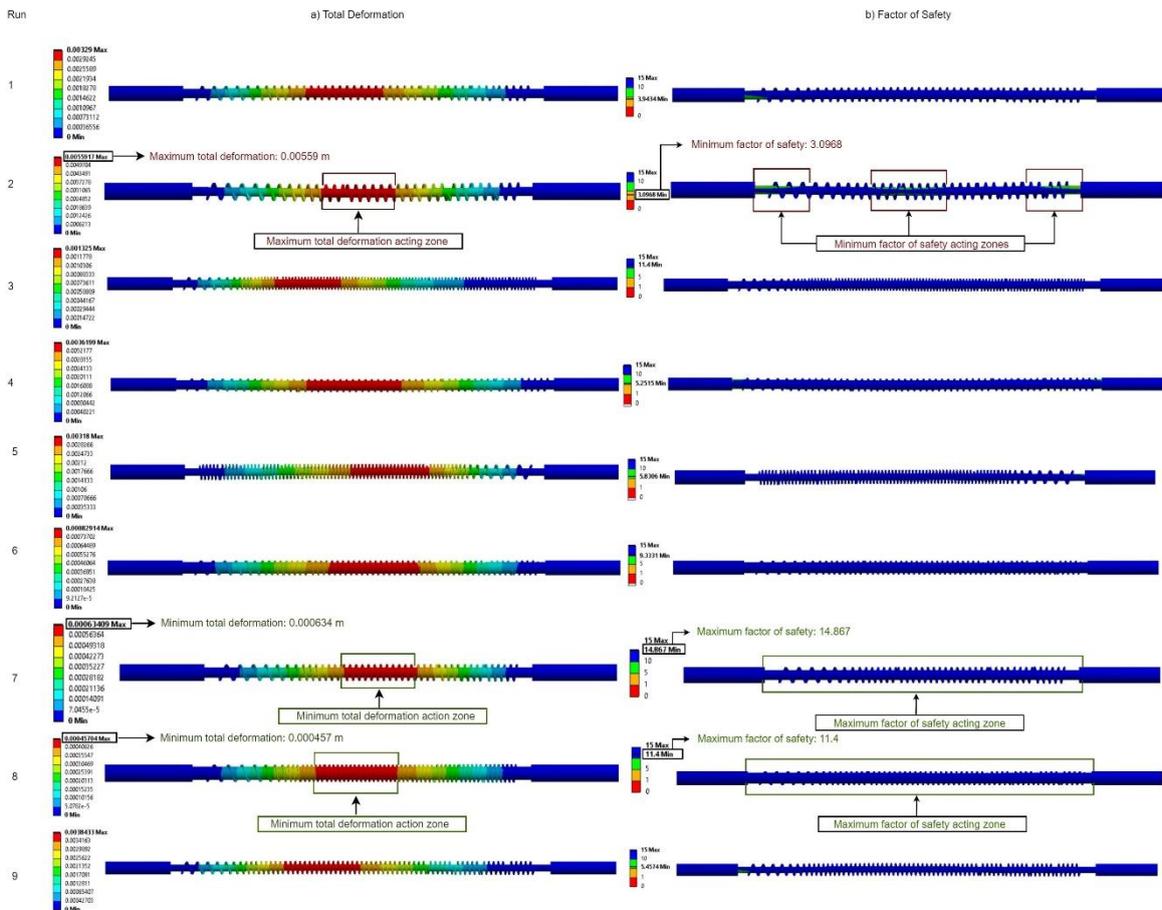Figure S4. Contour plot for (a) maximum bending stress in Pa; (b) maximum shear stress in Pa for Taguchi's design.

Figure S5. Contour plot for (a) total deformation in (m); (b) factor of safety with respect to Taguchi's design.
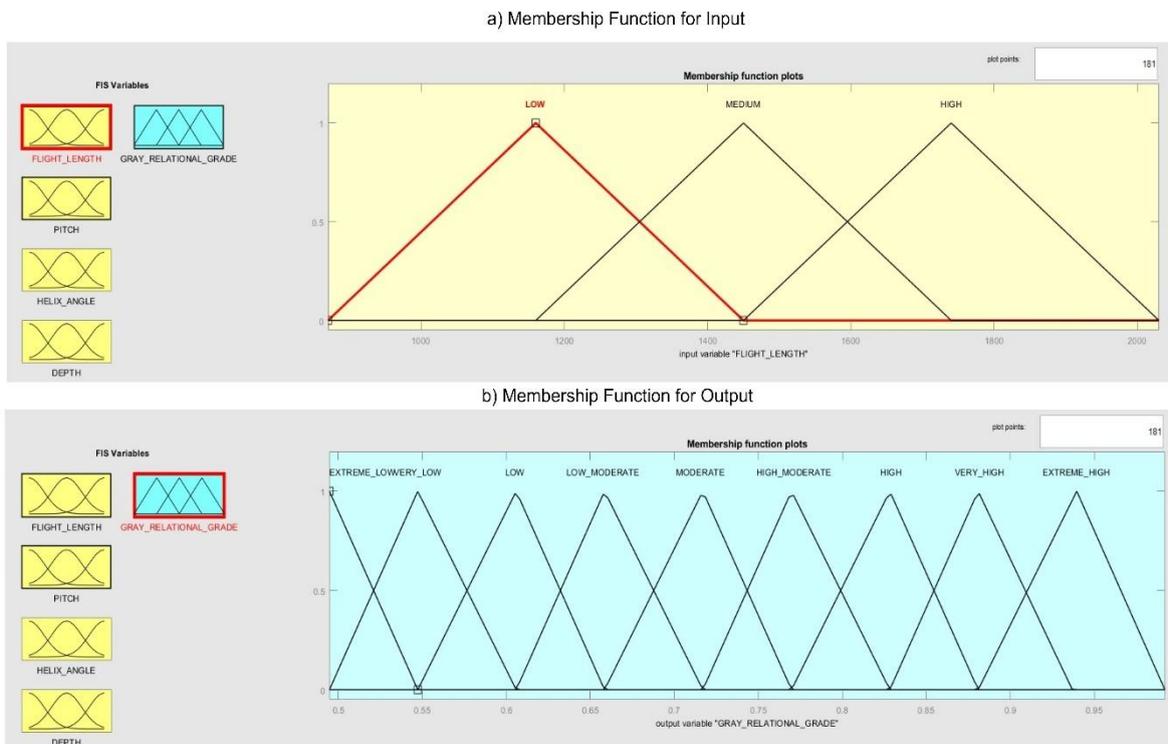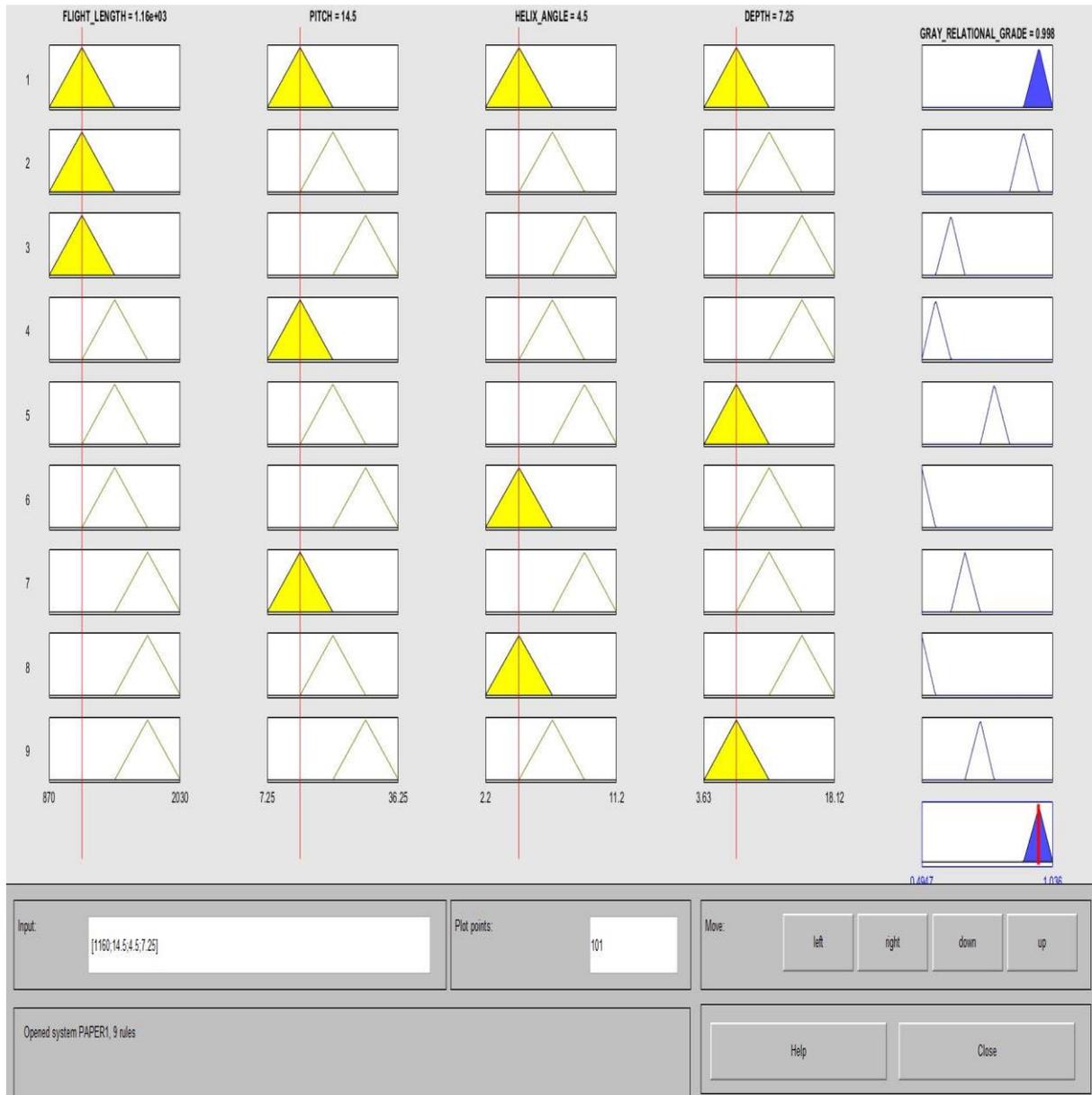

Figure S6. Fuzzy Membership function for (a) input; (b) output.

Figure S7. Fuzzy interface system based on customized rules.