Supplementary Material

The following figures are presented. It is emphasized that is separated from the main manuscrpit
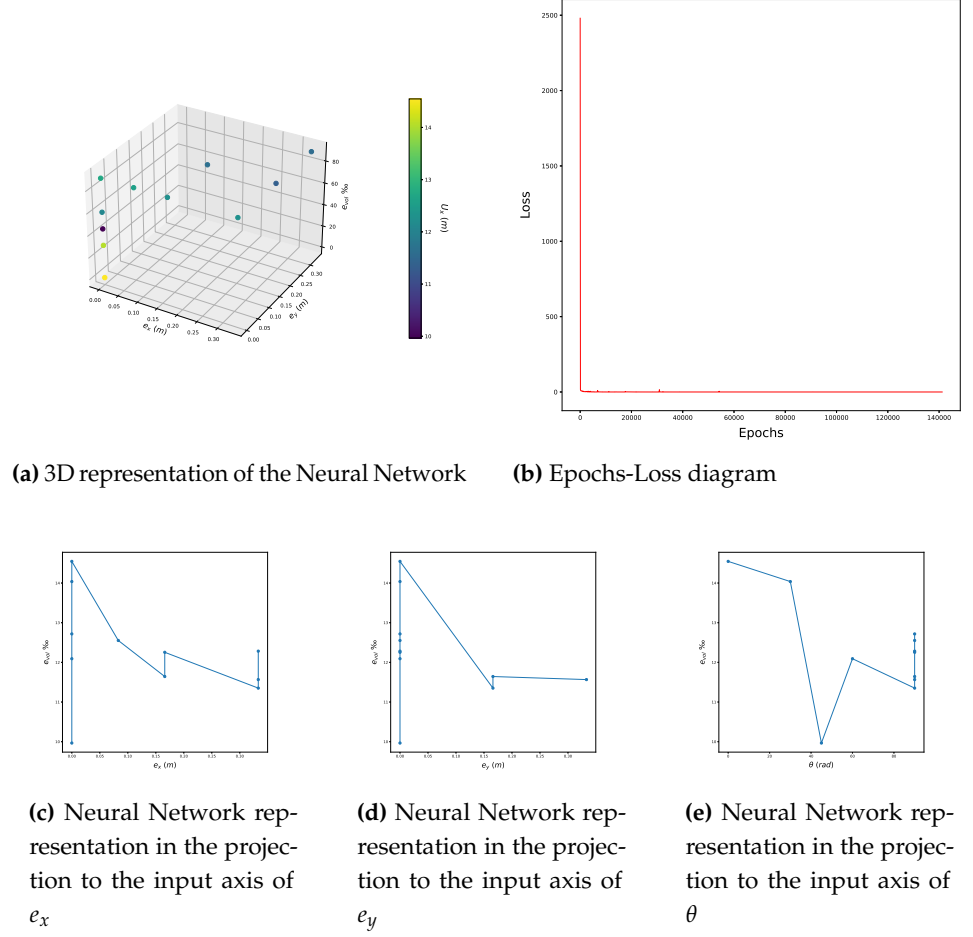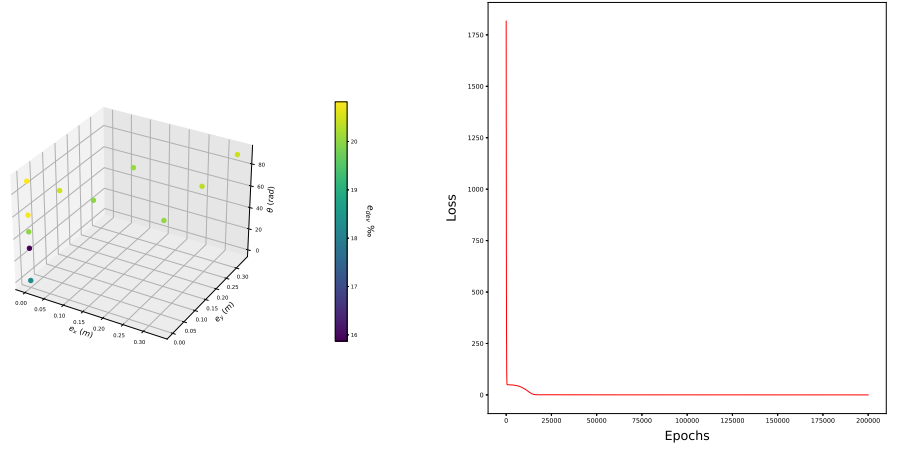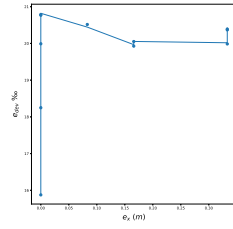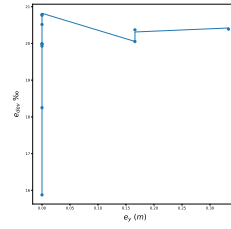

(a) 3D representation of the Neural Network

(b) Epochs-Loss diagram

(c) Neural Network representation in the projection to the input axis of e_x

(d) Neural Network representation in the projection to the input axis of e_y

(e) Neural Network representation in the projection to the input axis of θ

Figure S1. Graphical presentation of the Neural Network that corresponds to Monte Carlo analysis P-κ_{RF}-c_{RF}-$k_{RF-2} - 9$ (NN9) for the estimation of the volumetric component of the strain $e_{vol.}$
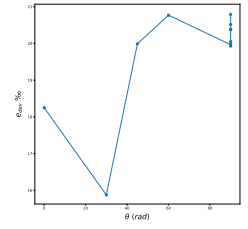
(a) 3D representation of the Neural Network

(b) Epochs-Loss diagram

(c) Neural Network representation in the projection to the input axis of e_x
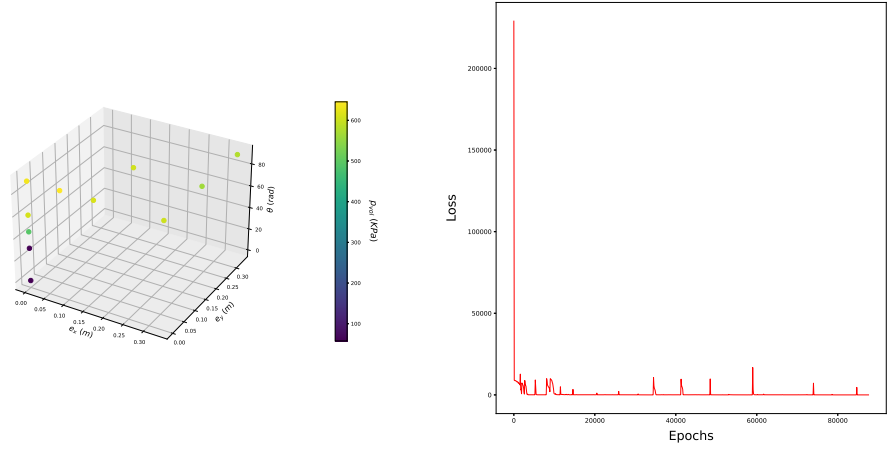

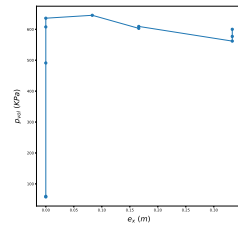**(d)** Neural Network representation in the projection to the input axis of e_y

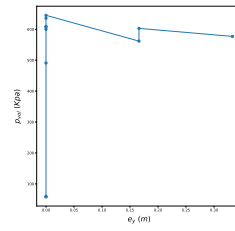**(e)** Neural Network representation in the projection to the input axis of θ

Figure S2. Graphical presentation of the Neural Network that corresponds to Monte Carlo analysis $\mathbf{P}$-κ_{RF}-c_{RF}-$k_{RF-2} - 9$ (NN9) for the estimation of the deviatoric component of the strain e_{dev}.
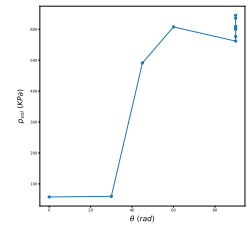
(a) 3D representation of the Neural Network

(b) Epochs-Loss diagram

(c) Neural Network representation in the projection to the input axis of e_x
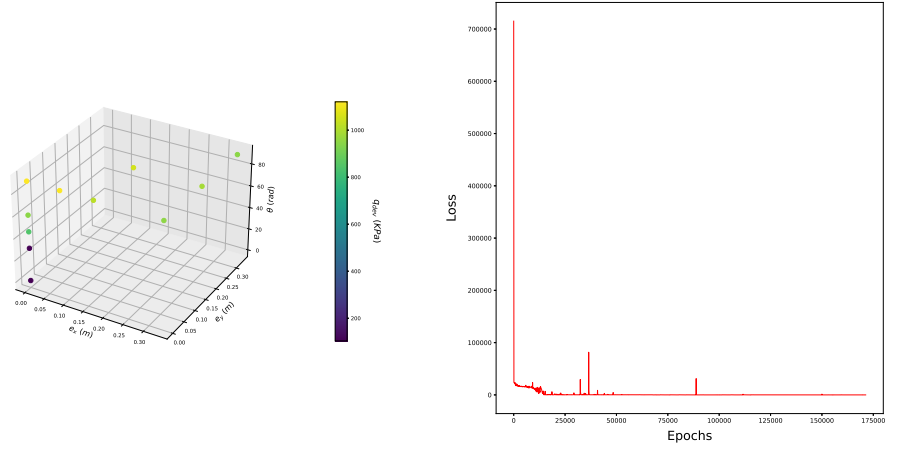
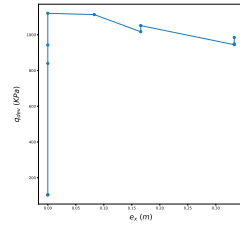**(d)** Neural Network representation in the projection to the input axis of e_y

(e) Neural Network representation in the projection to the input axis of θ
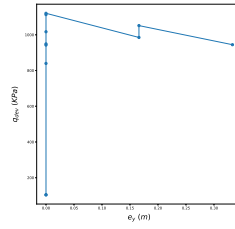
Figure S3. Graphical presentation of the Neural Network that corresponds to Monte Carlo analysis **P**-κ_{RF}-c_{RF}-$k_{RF-4} - 10$ (NN10) for the estimation of the volumetric component of the stress p_{vol} in kPa.
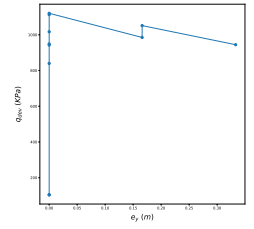
(a) 3D representation of the Neural Network

(b) Epochs-Loss diagram

(c) Neural Network representation in the projection to the input axis of e_x
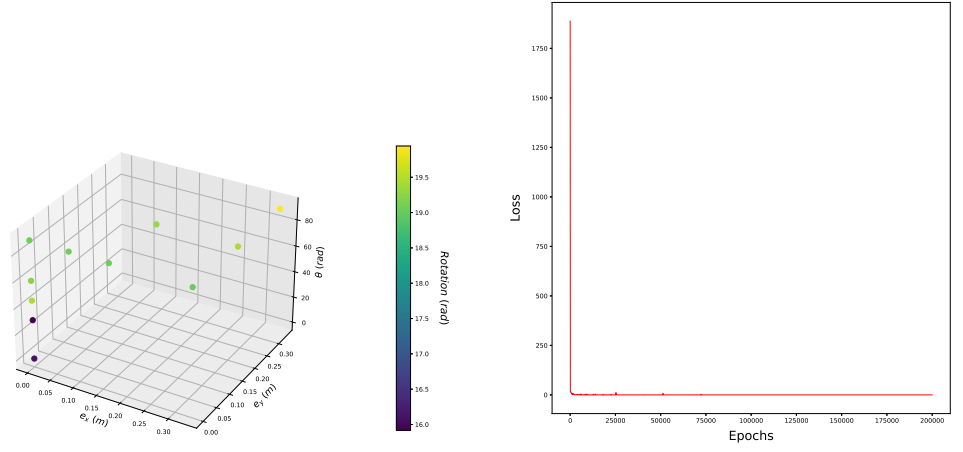

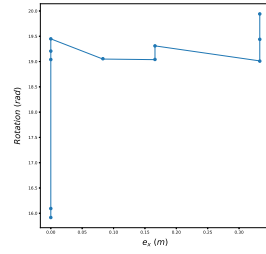**(d)** Neural Network representation in the projection to the input axis of e_y

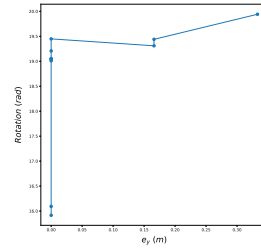**(e)** Neural Network representation in the projection to the input axis of θ

Figure S4. Graphical presentation of the Neural Network that corresponds to Monte Carlo analysis **P**-κ_{RF}–c_{RF}–$k_{RF-4} - 10$ (NN10) for the estimation of the deviatoric component of the stress q_{dev} in kPa.
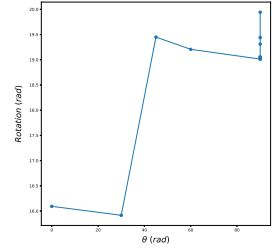
(a) 3D representation of the Neural Network

(b) Epochs-Loss diagram

(c) Neural Network representation in the projection to the input axis of e_x
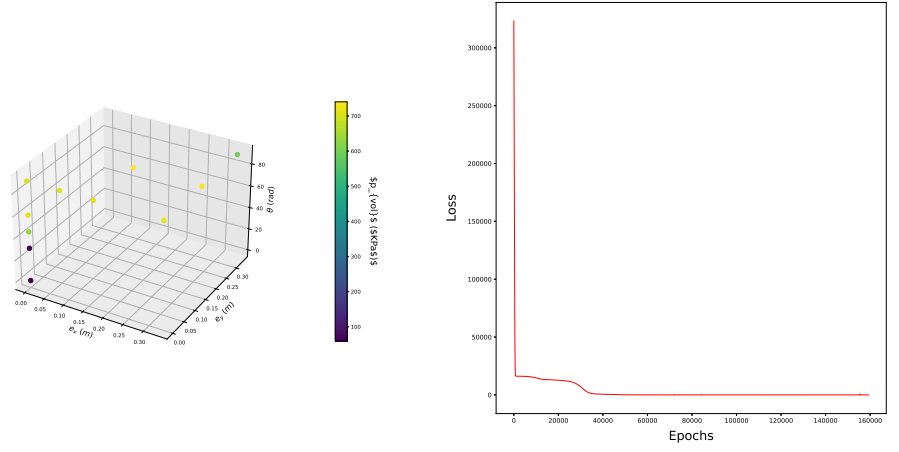

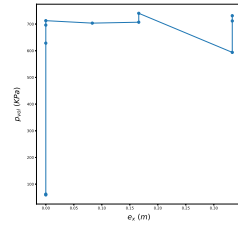**(d)** Neural Network representation in the projection to the input axis of e_y

(e) Neural Network representation in the projection to the input axis of θ

Figure S5. Graphical presentation of the Neural Network that corresponds to Monte Carlo analysis **S**-κ_L-c_R-d3 (NND3) for the estimation of the deviatoric component of the strain e_{dev}.

(a) 3D representation of the Neural Network

(b) Epochs-Loss diagram

(c) Neural Network representation in the projection to the input axis of e_x

(d) Neural Network representation in the projection to the input axis of e_y

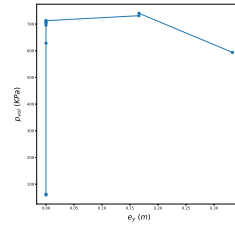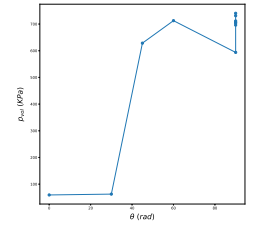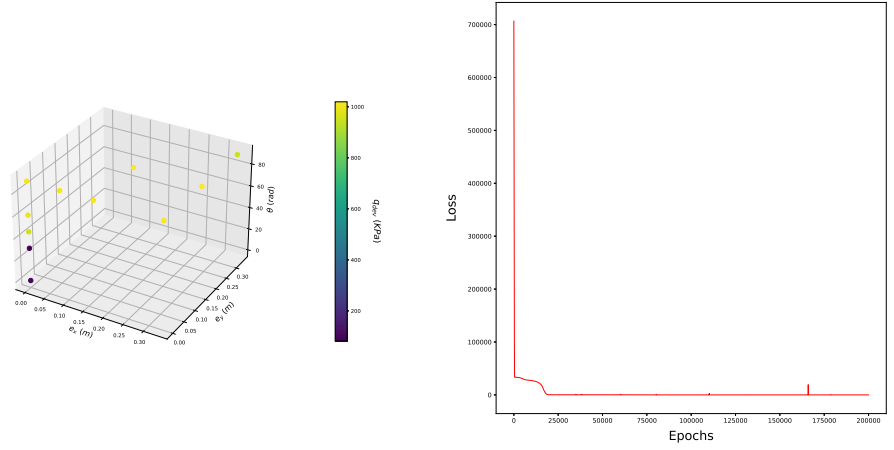**(e)** Neural Network representation in the projection to the input axis of θ

Figure S6. Graphical presentation of the Neural Network that corresponds to Monte Carlo analysis **S**-κ_L-c_D-d4 (NND4) for the estimation of the volumetric component of the stress p_{vol} in kPa.

(a) 3D representation of the Neural Network

(b) Epochs-Loss diagram

(c) Neural Network representation in the projection to the input axis of e_x

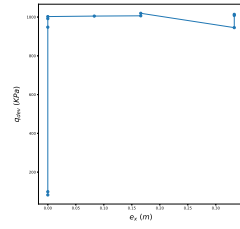**(d)** Neural Network representation in the projection to the input axis of e_y

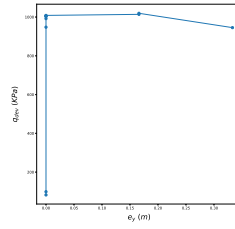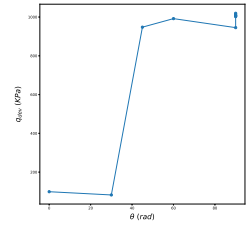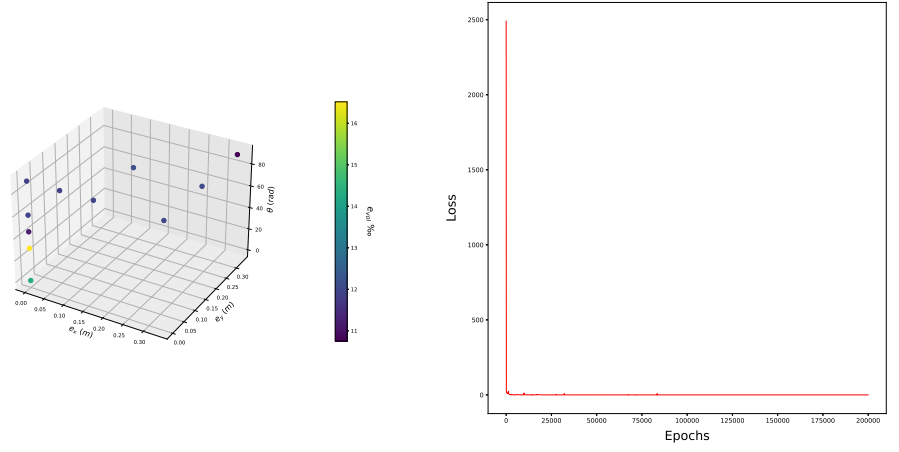**(e)** Neural Network representation in the projection to the input axis of θ

Figure S7. Graphical presentation of the Neural Network that corresponds to Monte Carlo analysis **S**-κ_L-c_D-d4 (NND4) for the estimation of the deviatoric component of the stress q_{dev} in kPa.

(a) 3D representation of the Neural Network

(b) Epochs-Loss diagram

(c) Neural Network representation in the projection to the input axis of e_x

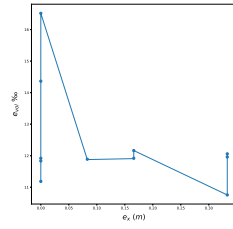**(d)** Neural Network representation in the projection to the input axis of e_y

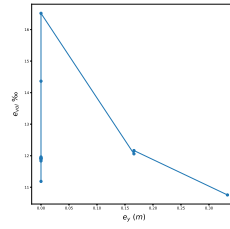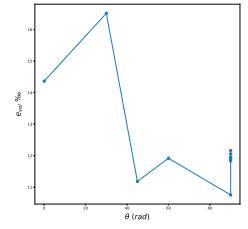**(e)** Neural Network representation in the projection to the input axis of θ

Figure S8. Graphical presentation of the Neural Network that corresponds to Monte Carlo analysis **S**-κ_L-c_D-d4 (NND4) for the estimation of the volumetric component of the strain $e_{vol.}$