The authors sincerely thank Reviewer 2 for the thoughtful and constructive feedback. The detailed comments have significantly contributed to improving the clarity and precision of our explanations, thereby enhancing the overall quality of the manuscript. We greatly value the reviewer's insights, which played a meaningful role in refining our work. All clarifications have been highlighted in red in the revised version of the manuscript.

	Second Reviewer Comments	Authors Response
1	The "elastic-plastic" in the title is misleading, since the analysis and discussion remain primarily within the elastic range. behaviour	Thank you for your observation. You are correct that the majority of the analysis is conducted within the elastic range. However, the term "elastic–plastic" was used to reflect the fact that the onset of plasticity was considered as the failure criterion in both the experimental and analytical models. Specifically, the transition from elastic to plastic behavior was identified through the force–displacement (F–δ) curves, which showed distinct changes in slope indicating yielding. Moreover, the stress values at which yielding begins—represented by the maximum tensile stress ($\sigma_{y\ ten}$) in the RDW root and the maximum compressive stress ($\sigma_{y\ com}$) in the rip plate—were found to vary significantly with the geometric ratio h′/tr. This ratio influences the extent of the elastic field and the initiation of plastic deformation, thereby affecting the structural behavior and fatigue performance. Indeed, for these reasons the authors would like to keep the title
2	What is the material model for the steel plate and weld? Why there is only one parameter, yield stress? The weld yield stress of 410 MPa appears to be a nominal value rather than a tested one. Tested yield stress of the weld should be used.	Thank you for your comment. The steel plate was tested experimentally, yielding: • f_y=335 MPa, f_u=447 MPa, ε = 24% For the weld, E6013 electrode was used, with manufacturer-provided properties: • f_y=410 MPa, f_u=470 MPa, ε = 28% Although widely used in bridge applications, we acknowledge that the weld metal was not tested separately in this study. Section 2 was modified and the clarification was added in red in the revised manuscript, and future work will include direct testing of weld specimens. Lines 156 -163

3	Residual stresses and heat-affected zone effects are known to significantly influence fatigue performance of welded joints but are not considered in this study. Their omission should be justified, and their potential influence discussed in the limitations.	Thank you very much for the comment. Residual stresses and heat-affected zone (HAZ) effects are known to influence fatigue performance, especially under tensile loading. In this study, the rip-deck section was subjected to compression loads in the rib plate, simulating the stress state in the cross-region with the floor beam. Since the RDW root was not directly exposed to tensile fatigue loading, residual stress and HAZ effects were not considered. Their omission may lead to higher stress concentrations in the RDW root. This limitation is acknowledged in red in the revised manuscript at the end of section 4 as the limitation of the present work. Lines 451 – 465.
4	Boundary conditions were not mentioned in the FE models.	The FE models were simply supported as the experimental one. (done).
5	Microscopy techniques were not employed, methods such as scanning electron microscopy (SEM) or optical microscopy could provide valuable insights into weld zone quality and crack initiation mechanical properties of ductile iron pipes: A comprehensive analysis" demonstrated how such approaches reveal inhomogeneity-related failures. Including a brif discussion or citation of the similar studies would enrich the background and support the relevance of future micros rural investigations.	Thank you for the suggestion. Microscopy techniques such as SEM and optical microscopy were not employed in this study, as the focus was on mechanical behavior and stress distribution. However, we agree that such methods offer valuable insights into weld zone quality and crack initiation. A brief discussion was added in red to the introduction to support the relevance of future microstructural investigations. Lines 69 – 74.
6	In the test, the applied loading in the experiment compresses the rip plate directly. But in the real bridge, there is no such loading condition. In fact, the ripped deck was subjected to bending along the rip direction. The rationale for the loading type	Thank you for the comment. The applied compression load in the experiment was designed to simulate the stress state in the negative bending region of the orthotropic steel deck, particularly in the cross-region near the floor beam where the rib plate experiences compressive forces. While this differs from full bending conditions, it allows controlled investigation of stress distribution and weld root behavior. The clarification was added to section 2 after Figure 4. Lines 195 – 201.

7	Boundary condition should be justified with the respect to real bridge service conditions.	The simply supported boundary condition was selected to replicate the structural behavior of the rip-deck section in the negative bending region of orthotropic steel bridge decks, particularly near the floor beam intersection. In real bridge service conditions, this region experiences compressive stresses due to bending, and the support configuration allows for a realistic simulation of load transfer and deformation. This setup also facilitates controlled observation of stress distribution and failure mechanisms in the RDW root and rib plate. This text was added to the revised version.
8	The reported R^2=1.0 for all models is unrealistic and maybe indicating overfitting.	The MLR analysis showed Adjusted R^2 = 1.0, indicating a strong linear relationship between the compression force (F) and the stress values ($\sigma_{y\ com}$ and $\sigma_{y\ ten}$). This result reflects the deterministic nature of the ANSYS simulation data, which lacks experimental noise. To verify the reliability of the regression models, their outputs were compared with ANSYS results, and the differences did not exceed 5%, confirming consistency without overfitting.
9	The study correctly identifies h'/t_r as a critical parameter but does not provide a clear physical interpretation of the observed relationships.	The physical interpretation of the h′/tr ratio is illustrated through the stress contours in the analytical models (Figure 11). When h′/tr exceeds the limit value, the rib plate behaves more flexibly, allowing compressive stresses to dominate. In contrast, when h′/tr is below the limit, the rib becomes stiffer, restricting deformation and causing stress concentration at the RDW root. This shift reflects the transition from distributed compression to localized tension, which directly affects fatigue performance. The following text was added to section 4 ‘The h′/tr ratio physically represents the slenderness of the inclined rib web. A higher ratio indicates a slenderer rib, which is more flexible and capable of distributing compressive stresses over a wider area. This results in dominant compressive behavior in the rib plate. Conversely, a lower h′/tr ratio corresponds to a stiffer rib section, which restricts deformation and causes stress concentration at the RDW root. This shift increases tensile stress and reduces fatigue resistance. Therefore, h′/tr governs the balance between structural flexibility and stress localization, making it a critical pa-rameter in welded joint performance.’