**Reviewer’s Responses to Questions:**

Question 1 – In Decision on submission: 1. Are the objectives and the rationale of the study clearly stated?

Reviewer #1: The objectives of the study are clearly stated, but the rationale of the study is not very clear. In the introduction：1. Why was this methodology used for the study? 2. A clear summary of existing research to highlight the innovations of this work. These two aspects can be improved.

Tentar resumir os problemas que envolvem túneis gêmeos. Estender o último parágrafo da introdução com mais detalhes: o que de fato será feito, a metodologia e o que há de novo.

Question 2 – In Decision on submission: 4. Could the manuscript benefit from additional tables or figures, or from improving or removing (some of the) existing ones?

Reviewer #3: Put color scales to Figure 13

Será adicionado as escalas na figura 13.

Question 3 – In Decision on submission: 5. If applicable, are the interpretation of results and study conclusions supported by the data?

Reviewer #3: No comparison with any case studies.Reviewer #5: Yes, but they need to be significantly improved - see attached pdf file.

Procurar um estudo de caso? Ou enfatizar os casos de comparação analíticas. E explicar as dificuldades em se obter os dados do revestimento.

Question 4 – In Decision on submission: 6. Have the authors clearly emphasized the strengths of their study/theory/methods/argument?

Reviewer #1: No. 1. Emphasized in the introduction; 2. Further elaboration in the methodology section; 3. Comparison with traditional methods in results.

Reviewer #2: No, please see the comments in detail as follows.

Reviewer #3: I understand the authors have spent many hours fighting against ANSYS and get those results. However, there is no comparison with case studies. Generally, speaking, it is difficult to publish a manuscript stating just calculation using a commercial software as a full paper.

Reviewer #4: not much novelty in methods

Reviewer #5: NO - it must be improved.

Explicar que o software é apenas uma ferramenta. O modelo constitutivo foi programado a parte no software. Tentar de alguma forma justificar a falta de estudos de caso.

Question 5 – In Decision on submission: 7. Have the authors clearly stated the limitations of their study/theory/methods/argument?

Reviewer #3: No, they haven't. Excavation sequence should be better followed. One tunnel advances and the other follows. This is a natural sequence and should be simulated in particular for inelastic analyses. In other words, if they don't simulate these sequences, there are almost no advantage of complex visco-elasto-plastic analyses. Comparison with case studies should be done. Consideration of discontinuities and pore water is very important.

A rigor está declarado claramente as limitações do estudo. Talvez explicar que pode ser um caso mais desfavorável usar escavações simultâneas (ou quem sabe procurar algum túnel na realidade em que foi escavado com as duas galerias ao mesmo tempo). Justificar melhor o pq de desconsiderar descontinuidades e poro pressão (argilas profundas).

Question 6 - In Decision on submission: 8. Does the manuscript structure, flow or writing need improving (e.g., the addition of subheadings, shortening of text, reorganization of sections, or moving details from one section to another)?

Reviewer #1: Yes. “7. Numerical Results and Discussion” This section is too long and not clear. Dividing it into sub-sections, e.g., 7.1 and 7.2, maybe helpful.

Reviewer #4: paper is too long

Tentar dividir o capítulo de resultados e deixar mais claro.

**Comentários para os autores**

**Reviewer #1**

Page 2 of 28, "… making three-dimensional finite element analyses essential…". From the Introduction I can get that "developing a realistic and safe design for tunnel junctions" is important, but why is using 3D finite element analysis? From the Introduction, it does not seem to understand that 3D finite element analysis is essential.

Explicar melhor a necessidade de análises 3D FEM nesse caso. Justamente pelo domínio e necessidade de simular o processo de escavação.

Page 2 of 28, "…but little research has been done on twin tunnels, especially with a gallery". It is hard for me to get useful information. It is recommended to summarize the issues that need to be solved in twin tunnels to highlight the focus of this paper. So what is the novelty of this paper? This should be stated clearly in the Introduction.

Tentar resumir os problemas que envolvem túneis gêmeos. Estender o último parágrafo da introdução com mais detalhes: o que de fato será feito, a metodologia e o que há de novo.

Page 5 of 28, "E0 is the modulus of elasticity of the concrete aggregates and microscopic particles of the cement paste" Is the modulus of elasticity of both the concrete aggregates and microscopic particles of the cement paste equal to E0? The microscopic particles of the cement paste include both hydration products and unhydrated cement particles and are not equal to the elastic modulus of the aggregate.

O E0 representa o módulo de elasticidade de uma forma homogeneizada dos agregados e da pasta de cimento (hidratada e não hidratada)

The title highlights the plasticity and time-dependent constitutive models. The importance of plasticity and time dependence needs to be explained at the appropriate places in Sections 3 and 4.

Quem sabe explicar a questão dos domínios no interior do maciço conforme ocorre o carregamento. Que não é captado por modelos que não tem esse aspecto.

Page 5 of 28, Eq. (7). How is D\* determined?

É explicado no artigo que ele incorpora o envelhecimento do concreto. Porém, não é mostrado como ele é determinado. Quem sabe colocar a sua expressão.

Page 13 of 28, "7. Numerical Results and Discussion". This section is too long and not clear. Dividing it into subsections, e.g., 7.1 and 7.2, maybe clear. The "Results and discussion" of the following paper may be helpful. <https://doi.org/10.1016/j.cemconres.2023.107267>.

No artigo referenciado está separado por: efeito de tal coisa, efeito de tal coisa...Fazer uma subdivisão parecida.

What is the mechanical behavior of concrete of the lining? What are the causes of shrinkage and creep of concrete here? External loads or due to cement hydration?

Explicar melhor o que causa o fenômeno da fluência e retração no concreto. A princípio é um fenômeno conjunto, devido a hidratação e as cargas externas.

In the Conclusion, it is helpful to define the acronyms that appear.

Deve ser definir o que significa EPVP-EL e EPVP-VEL.

The serial numbers in the references are missing and the reference numbers in the manuscript do not start at [1]. In addition, the number of references seems inadequate.

O número das referências no modelo segue a ordem alfabética. Por isso não é a ordem de citação.

Line numbers are missing, resulting in some specific problems I can't easily point out.

No modelo não tinha números nas linhas.

**Reviewer #2**

There are numerous discussions in the paper on well-established phenomena, such as the impact of liner stiffness and tunnel distance on convergence. Unfortunately, the discussions have not yielded any novel or insightful conclusions. As a result, the manuscript reads more like an engineering report than a research paper.