Decision on submission to International Journal of Rock Mechanics and Mining Sciences

De: International Journal of Rock Mechanics and Mining Sciences (em@editorialmanager.com)

Para: fel_quevedo@yahoo.com.br

Data: segunda-feira, 29 de janeiro de 2024 às 00:12 BRT

Manuscript Number: **IJRMMS-D-23-01075**

Numerical analysis of the rock deformation in twin tunnels with transverse galleries considering plasticity and time-dependent constitutive models

Dear Dr. Quevedo,

Thank you for submitting your manuscript to International Journal of Rock Mechanics and Mining Sciences.

I regret to inform you that the reviewers recommend against publishing your manuscript, and I must therefore reject it. My comments, and any reviewer comments, are below.

We appreciate you submitting your manuscript to International Journal of Rock Mechanics and Mining Sciences and thank you for giving us the opportunity to consider your work.

Kind regards,
Professor Jian Zhao
Editor-in-Chief

International Journal of Rock Mechanics and Mining Sciences

Editor and Reviewer comments:

Reviewer's Responses to Questions

Note: In order to effectively convey your recommendations for improvement to the author(s), and help editors make well-informed and efficient decisions, we ask you to answer the following specific questions about the manuscript and provide additional suggestions where appropriate.

1. Are the objectives and the rationale of the study clearly stated?

Please provide suggestions to the author(s) on how to improve the clarity of the objectives and rationale of the study. Please number each suggestion so that author(s) can more easily respond.

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.

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

Reviewer #3: y

Reviewer #4: yes

Reviewer #5: In my opinion it requires revision - details in the attached pdf file.

---

2. If applicable, is the application/theory/method/study reported in sufficient detail to allow for its replicability and/or reproducibility?

Please provide suggestions to the author(s) on how to improve the replicability/reproducibility of their study. Please number each suggestion so that the author(s) can more easily respond.

Reviewer #1: Mark as appropriate with an X:
Yes [√] No [] N/A []
Provide further comments here:

Reviewer #2: Mark as appropriate with an X:
Yes [] No [] N/A [X]
Provide further comments here:
Please see the comments in detail as follows.

Reviewer #3: Mark as appropriate with an X:
Yes [x] No [] N/A []
Provide further comments here:

Reviewer #4: Mark as appropriate with an X:
Yes [X] No [] N/A []
Provide further comments here:

Reviewer #5: Mark as appropriate with an X:
Yes [] No [X] N/A []
Provide further comments here:
In my opinion it requires revision - details in the attached pdf file.

---

3. If applicable, are statistical analyses, controls, sampling mechanism, and statistical reporting (e.g., P-values, CIs, effect sizes) appropriate and well described?

Please clearly indicate if the manuscript requires additional peer review by a statistician. Kindly provide suggestions to the author(s) on how to improve the statistical analyses, controls, sampling mechanism, or statistical reporting. Please number each suggestion so that the author(s) can more easily respond.

Reviewer #1: Mark as appropriate with an X:
Yes [] No [√] N/A []
Provide further comments here:

Reviewer #2: Mark as appropriate with an X:
Yes [] No [] N/A [X]
Provide further comments here:
Please see the comments in detail as follows.

Reviewer #3: Mark as appropriate with an X:
Yes [] No [] N/A [x]
Provide further comments here:

Reviewer #4: Mark as appropriate with an X:
Yes [] No [] N/A [X]
Provide further comments here:

Reviewer #5: Mark as appropriate with an X:
Yes [] No [] N/A [X]
Provide further comments here:

---

4. Could the manuscript benefit from additional tables or figures, or from improving or removing (some of the) existing ones?

Please provide specific suggestions for improvements, removals, or additions of figures or tables. Please number each suggestion so that author(s) can more easily respond.

Reviewer #1: The tables or figures are clear.

Reviewer #2: No need

Reviewer #3: Put color scales to Figure 13.

Reviewer #4: yes

Reviewer #5: No

---

5. If applicable, are the interpretation of results and study conclusions supported by the data?

Please provide suggestions (if needed) to the author(s) on how to improve, tone down, or expand the study interpretations/conclusions. Please number each suggestion so that the author(s) can more easily respond.

Reviewer #1: Mark as appropriate with an X:
Yes [√] No [] N/A []
Provide further comments here:

Reviewer #2: Mark as appropriate with an X:
Yes [] No [] N/A [X]
Provide further comments here:
Please see the comments in detail as follows.

Reviewer #3: Mark as appropriate with an X:
Yes [] No [x] N/A []
Provide further comments here: No comparison with any case studies.

Reviewer #4: Mark as appropriate with an X:
Yes [X] No [] N/A []
Provide further comments here:

Reviewer #5: Mark as appropriate with an X:
Yes, but they need to be significantly improved - see attached pdf file.

---

6. Have the authors clearly emphasized the strengths of their study/theory/methods/argument?

Please provide suggestions to the author(s) on how to better emphasize the strengths of their study. Please number each suggestion so that the author(s) can more easily respond.

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.
In my opinion it requires revision - details in the attached pdf file.

---

7. Have the authors clearly stated the limitations of their study/theory/methods/argument?

Please list the limitations that the author(s) need to add or emphasize. Please number each limitation so that author(s) can more easily respond.

Reviewer #1: The authors clearly state the fundamental assumptions of their methods.

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

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.

Reviewer #4: yes

Reviewer #5: Yes

---

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)?

Please provide suggestions to the author(s) on how to improve the manuscript structure and flow. Please number each suggestion so that author(s) can more easily respond.

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 #2: Yes

Reviewer #3: n

Reviewer #4: paper is too long

Reviewer #5: Yes - see attached file.

---

9. Could the manuscript benefit from language editing?

Reviewer #1: No

Reviewer #2: Yes

Reviewer #3: No

Reviewer #4: Yes

Reviewer #5: Yes

The AE:
The comments of the reviewers are mostly negative. They have outlined the poor originality of the work and the bad quality of the manuscript.

Reviewer #1: This field is optional. If you have any additional suggestions beyond those relevant to the questions above, please number and list them here.

Comments to the Authors

"Numerical analysis of the rock deformation in twin tunnels with transverse galleries considering plasticity and time-dependent constitutive models" by Quevedo, F. P. M et al.

- This manuscript investigates the rock deformation in twin tunnels with transverse galleries using the ANSYS. To capture the deformation, different constitutive models were selected for rock and lining, taking into account elastic, plastic, and creep deformations. The results show that this study has the potential to provide technical guidance for the design of tunnel junctions.

The topic is relevant for the readers of the International Journal of Rock Mechanics and Mining Sciences. The innovation of the paper should be the constitutive model and tunnel structure. Although the constitutive models are the existing classical models, there is little research on the twin tunnels with transverse galleries. In addition, the contribution of this manuscript is that the numerical analysis is detailed, which has the potential to provide technical guidance for the design of the twin tunnels with transverse galleries. However, the following comments should be addressed before further consideration of the publication.

Major comments:

>>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.

>> 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.

>> 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.

>>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.

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

>> Page 13 of 28, "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 clear. The "Results and discussion" of the following paper may be helpful. https://doi.org/10.1016/j.cemconres.2023.107267.

Minor comments:

>> 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?

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

>> 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.

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

Reviewer #2: The paper focuses on the performance of twin tunnels under excavation, a topic that is not very attractive. It has been widely accepted that, the stress and displacement of twin tunnels may larger than those of single tunnels. Additionally, FEM is used, and no theoretical development can be found in the paper. In light of this, it is essential for the conclusion of the paper to contribute valuable insights to the design of twin tunnels. Unfortunately, the observations presented in the paper simply reiterate information already established, offering little valuable information to enhance our understanding.
Detailed comments are provided as follows:
1. 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.
2. The mesh effect of the FEM model should be considered and checked. Especially, in this paper, the liner is discretized into two layers. And, there is no information provided in the paper regarding the adequacy of the mesh size for both the rock and tunnel structures.
3. The size effect is crucial due to the nonlinear material properties. However, there are concerns about the model's geometry. The tunnel radius is only 1m, which is unreasonably small. Furthermore, the tunnel is in a circular shape, which deviates from the typical geometry of rock tunnels. Therefore, the applicability of the numerical results is questionable.

Reviewer #3: Why is Poisson's ratio of rock is 0.498? This is a very eccentric value.

Reviewer #4: thanks for submitting your work to RMMS. the authors conducted parametric analysis on deformation behavior in twin tunnels considering different constitutive modes. However, this is pure an application study using commercial software. Limited novelty can be found in this paper regarding the methodology or numerical techniques. The authors assumed isotropic stress state, which could hardly be the case in reality. Therefore, the conclusions drew from those analysis may not be reliable. The result analysis part is too long and somehow reductant and the findings are pretty common sense with limited novel findings. Based on this, I cannot recommend this paper for further consideration for RMMS.

Reviewer #5: Dear Authors, I have carefully read your paper and to be honest: on one hand it is quite interesting, but on the other one there is so much doubt and assumptions that are not clearly described.
Furthermore after reading your paper, beyond all my remarks summarized in attached file, I do not really know how your paper impacts the filed of numerical analyses in tunneling. Most of the finding in conclusions seem to be very predictable without making calculations.
To be honest I was hesitating between "rejection" and "major revision". Finally I decided to give you the chance to improve the paper, so my decision is "major revision". Please find my comments in pdf file.
Regards

Reviewer

FAQ: How can I reset a forgotten password?
https://service.elsevier.com/app/answers/detail/a_id/28452/supporthub/publishing/
For further assistance, please visit our customer service site:
https://service.elsevier.com/app/home/supporthub/publishing/
Here you can search for solutions on a range of topics, find answers to frequently asked questions, and learn more about Editorial Manager via interactive tutorials. You can also talk 24/7 to our customer support team by phone and 24/7 by live chat and email

At Elsevier, we want to help all our authors to stay safe when publishing. Please be aware of fraudulent messages requesting money in return for the publication of your paper. If you are publishing open access with Elsevier, bear in mind that we will never request payment before the paper has been accepted. We have prepared some guidelines (https://www.elsevier.com/connect/authors-update/seven-top-tips-on-stopping-apc-scams) that you may find helpful, including a short video on Identifying fake acceptance letters (https://www.youtube.com/watch?v=o5l8thD9XtE).
Please remember that you can contact Elsevier s Researcher Support team (https://service.elsevier.com/app/home/supporthub/publishing/) at any time if you have questions about your manuscript, and you can log into Editorial Manager to check the status of your manuscript (https://service.elsevier.com/app/answers/detail/a_id/29155/c/10530/supporthub/publishing/kw/status/).
#AU_IJRMMS#

To ensure this email reaches the intended recipient, please do not delete the above code

---