# Article information:

Effect of stress paths on failure mechanism and progressive damage of hard-brittle rock | SpringerLink
<http://link-springer-com-s.vpn.chd.edu.cn:8080/article/10.1007/s11629-020-6554-9>

# Article summary:

1. The stress path and adjustment process during deep-buried hard-brittle rock tunnel excavation can lead to a stress-cracking type of rock failure mode.

2. Increasing confining pressure improves mechanical parameters but reduces brittle failure features, while unloading state results in more remarkable stress drop and unstable failure characteristics.

3. Energy dissipation and release play a role in driven rock progressive damage, with energy hardening and accumulation weakened by increasing confining pressure while progressive damage evolution characteristics are enhanced.

# Article rating:

May be slightly imbalanced: The article presents the information in a generally reliable way, but there are minor points of consideration that could be explored further or claims that are not fully backed by appropriate evidence. Some perspectives may also be omitted, and you are encouraged to use the research topics section to explore the topic further.

# Article analysis:

The article titled "Effect of stress paths on failure mechanism and progressive damage of hard-brittle rock" presents the results of experimental tests conducted on hard-brittle sandstone to investigate the effect of stress paths on failure mechanisms and progressive damage. The article is well-structured, with a clear introduction, methodology, results, and discussion sections. However, there are some potential biases and limitations in the study that need to be addressed.

One potential bias in the study is that it only focuses on one type of rock (hard-brittle sandstone), which may not be representative of other types of rocks. The authors acknowledge this limitation in their discussion section but do not provide any suggestions for future research to address this issue.

Another potential bias is that the study only considers the effect of confining pressure on rock failure mechanisms and progressive damage. Other factors such as temperature, humidity, and geological structures can also affect rock behavior under stress. Therefore, the results presented in this study may not be applicable to all real-world scenarios.

The article also lacks a comprehensive discussion of possible counterarguments or alternative explanations for the observed phenomena. For example, while the authors suggest that energy dissipation and release are internal powers driving rock progressive damage, they do not consider other possible factors such as chemical reactions or external forces acting on the rock.

Furthermore, some claims made in the article are unsupported by evidence or require further clarification. For instance, the authors state that an increase in confining pressure weakens energy hardening and accumulation features but enhances progressive damage evolution characteristics. However, they do not explain why this is so or provide any data to support their claim.

Finally, while the article does note some potential risks associated with deep-buried tunnel excavation in hard-brittle rocks (such as stress-cracking type failures), it does not provide a comprehensive analysis of these risks or suggest ways to mitigate them.

In conclusion, while the article provides valuable insights into how stress paths affect rock failure mechanisms and progressive damage in hard-brittle sandstone, it has some limitations and biases that need to be addressed. Future research should consider a wider range of rocks and factors affecting rock behavior under stress to provide more comprehensive insights into this complex phenomenon.

# Topics for further research:

* Factors affecting rock behavior under stress beyond confining pressure
* Alternative explanations for energy dissipation and release in rock progressive damage
* Comparison of hard-brittle sandstone to other types of rocks in stress path experiments
* Risks associated with deep-buried tunnel excavation in hard-brittle rocks
* Mitigation strategies for stress-cracking type failures in tunnel excavation
* Comprehensive analysis of factors affecting rock behavior in real-world scenarios

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