*The 2023 World Congress on*
***Advances in Structural Engineering and Mechanics (ASEM23)***
*GECE, Seoul, Korea, August 16-18, 2023*

# Machine Learning-Based Approach for Identifying Shear Transfer Mechanisms in RC Beams

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## ABSTRACT

The rapid development of machine learning (ML) technique provides new resort to reveal the intricate shear transfer mechanisms of reinforced concrete (RC) beams. A total of 1224 shear test specimens were carefully collected. On this basis, a decision tree-based machine learning program was developed to identify the correlations between shear capacity of RC beams and key influential parameters. In this program, three independent ML models were trained with various combinations of plausible datasets. The ML model with the best performance was employed to conduct detailed parametric study. It appeared that the presence of shear reinforcements can result in overestimation of pure shear contribution from concrete ($V_c$) because of the inter-dependent effect between shear reinforcement and concrete. In addition, it appeared that the so-called size effect has also significantly impacts on the shear contribution of concrete ($V_c$), while the presence of shear reinforcements can effectively mitigate the size effect. It was found that the shear contribution of concrete seems to be the primary source of shear resistance when shear span-depth ratio (*a/d*) less than 1.0. Whereas, shear reinforcements become the primary contribution to the shear resistance for RC members with *a/d* greater than 2.0.

## REFERENCES

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