**Introduction**

Shear-resisting bolted connections are commonly used in many engineering projects. The shear behaviour of this form of connections is often predicted by detailed finite element modelling. However, this modelling method often requires presentation of individual bolts with relatively fine mesh of nonlinear 3-dimensional solid elements. Contact between volumns is simulated with frictional contact pairs between master surfaces and slave surfaces and pretension is considered through change of temperature. This method can achieve sufficient accuracy at a price of computation time and therefore it is not suitable for numerical analysis for a large structure system. Although there are some simplified models that are computationally efficient, the contact interaction, or the slip between connecting pairs, or the effects of pretension force in these models are not well taken into account, resulting in significant loss in simulation accuracy. In this research, a new modelling method for double-lap shear-resisting bolted joints is developed. Shell and solid elements are not required in this model and a fine mesh is not required. It can be used for large scale structural analysis.

**Typical shear load – shear deformation curve for double-lap joints**

Shear deformation of a double-lap joint includes 3 stages as is shown in Fig. 1

**Modelling of steel plates**

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**Modelling of interactions**

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**Validation of the new modelling method**

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**Use of the new modelling method in large-scale structural analysis**

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