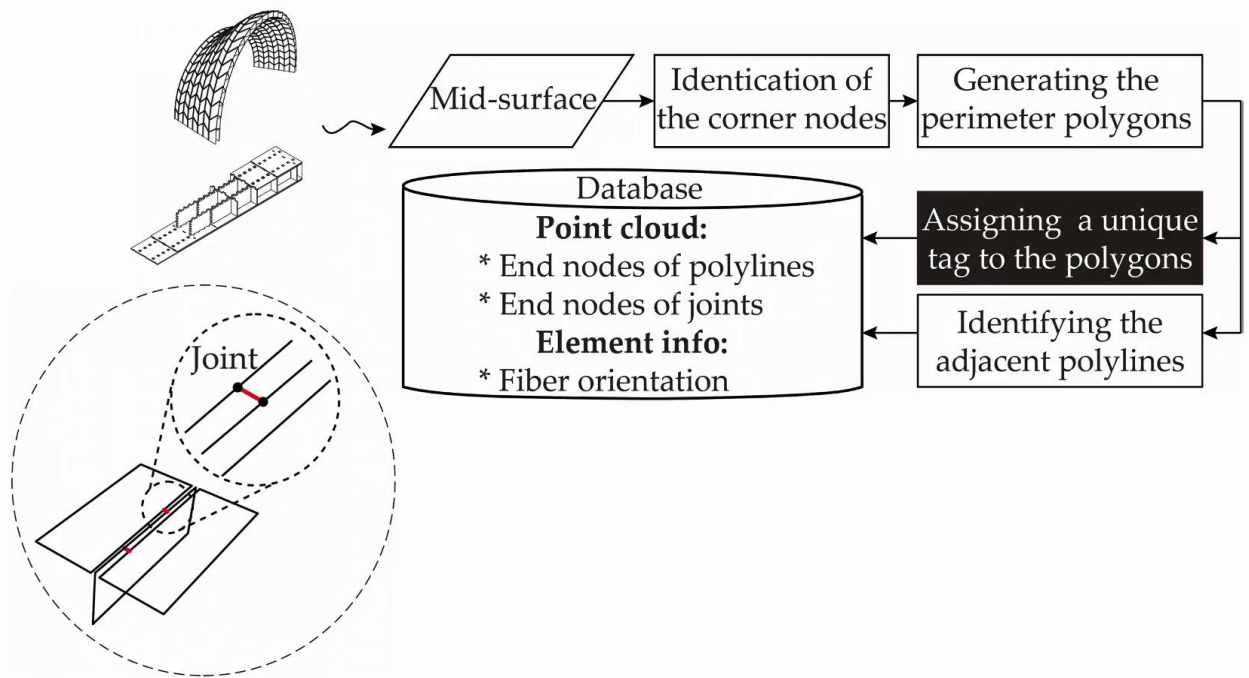




Video



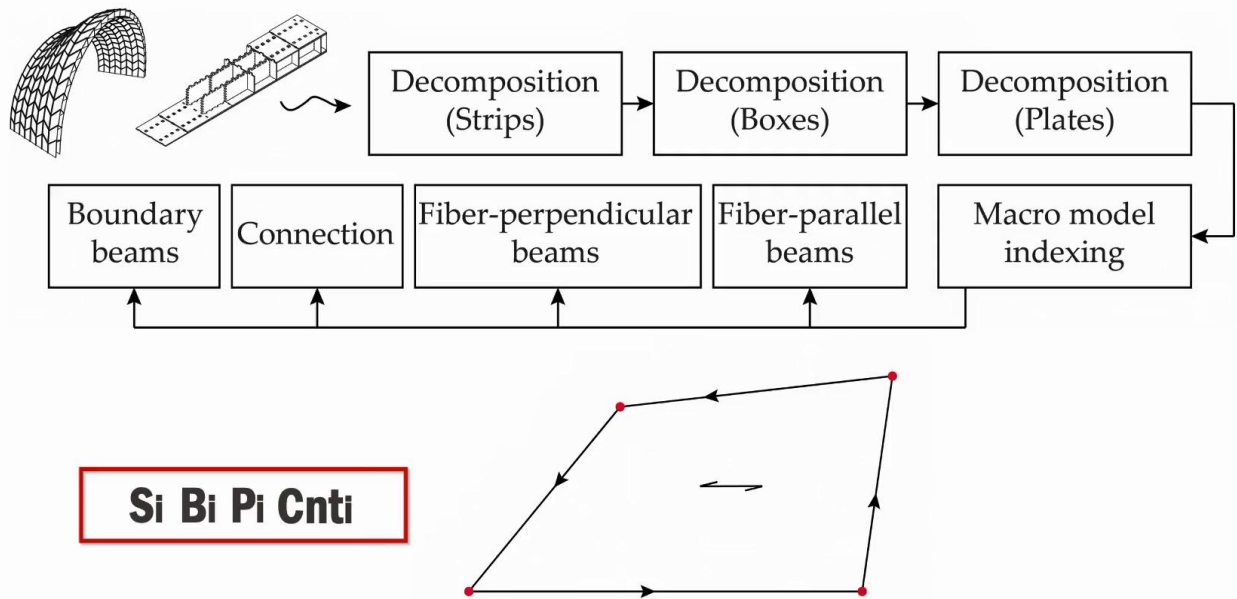


Now we have gained insight into the different modelling approaches, and it's time to tackle the building scale. In this section, an algorithmic modular framework is introduced to receive the 3D geometry of a custom-defined IDB structure, computer mechanical properties, and nongeometric information of the associated macro model, and finally, construct the CAE model. The CAD-to-CAE data exchange schemes starts with identifying the mid-surface associated with each timber plate. The associated corner nodes are then identified. Using these corner nodes, the perimeter polygon is consequently generated. Next, an approximate search algorithm is introduced to identify the two nearest polygons, then, the perimeter polygons and end nodes of the joints are stored in a hierarchical database. And to provide this section, another algorithm is introduced to assign a unique index or tag to each identified polygon and joint.

Notes

Summary



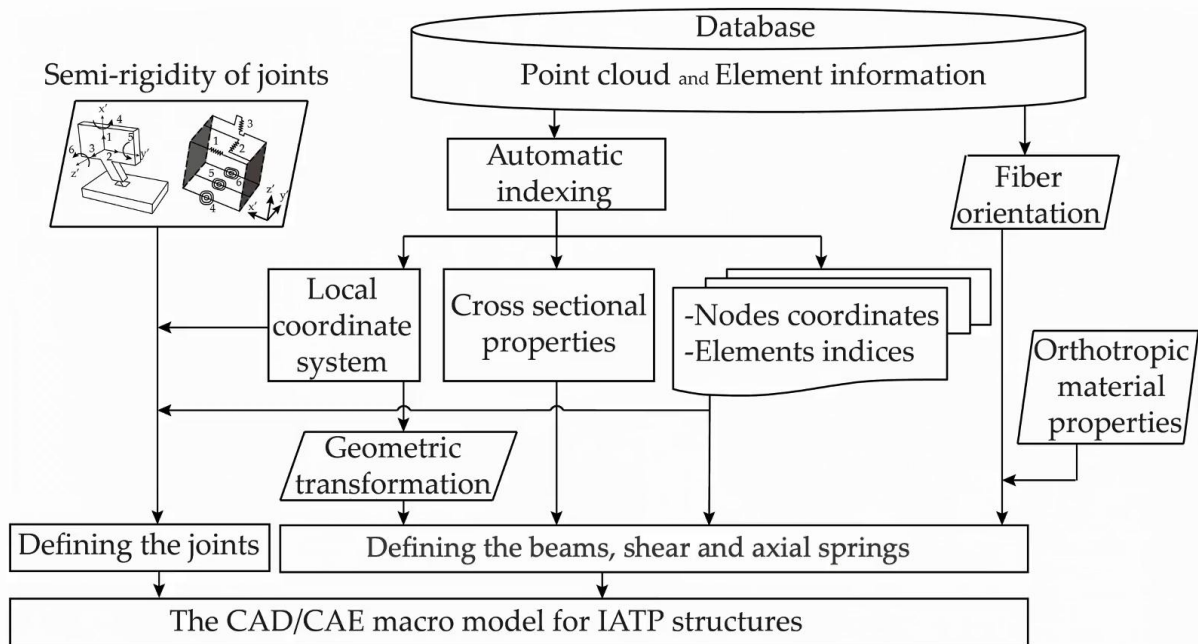


Toward this end, the structural system is first decomposed and a unique identification tag is assigned to each timber plate based on its associated strip number, box number, and the plate number. In other words, an IATP structure is constructed by assembling unique strips. Each strip is an assembly of multiple boxes, and each box consists of IMA-connected timber plates. Next, having the plate, the components of the macro model can be generated. It is also necessary to assign a unique tag to each component as well. Accordingly, fibre-parallel beams and associated nodes, fibre-perpendicular beams and associated nodes, connections and associated nodes, and boundary elements and the four corner nodes are generated and stored in a tree. Therefore, each component of a macro model associated with a timber plate can be found in a 3D space with these four digits that you see. The framework is written in Rhino and Grasshopper 3D CAD environment using Python programming.

Notes

Summary



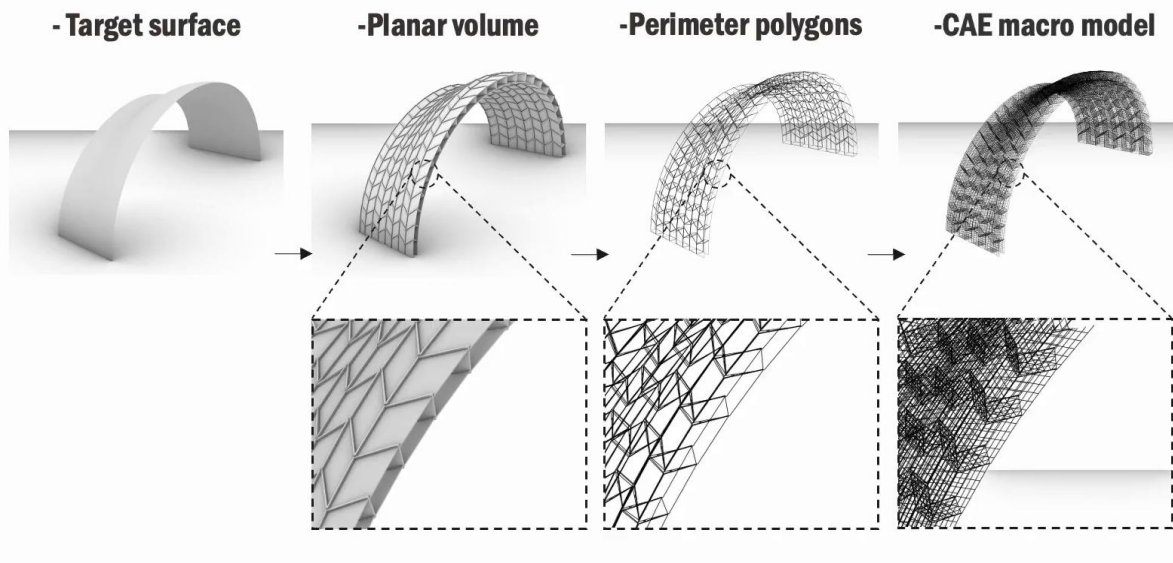


Now, and given this algorithm of indexing and data structure, the geometric and non-geometric information of an IATP component are provided. Even the fibre orientation of the nature of timber and geometric transformations such as linear, P-delta, corotational, et cetera, the beam elements, shear and axial springs are defined. Using the data from the physical experiments, the IMAS are defined, and consequently, the computer-aided engineering macro model is constructed.

Notes

Summary





So, to summarise this section using the targeted surface and developing the associated CAD 3D model, the perimeter polygons are identified, and the associated computer-aided engineering macro model is then constructed.

Notes

Summary

