

IRONCAD – STRUCTURED PARTS – KEY DIFFERENCES

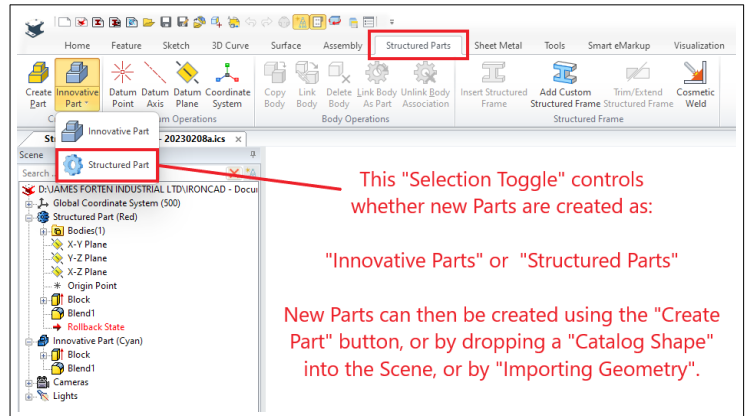
“Structured Part Modelling” within IRONCAD offers similar functionality typically associated with **Feature Based Modelling**, in combination with some of the freedom typically associated with **Direct Face Modelling**.

“Structured Part Modelling” is best suited for **more complex multi-bodied models**; as there are greater possibilities for advanced users. However, these are slower and harder to create, as there are more rules to understand and follow (with limited benefit for simpler models).

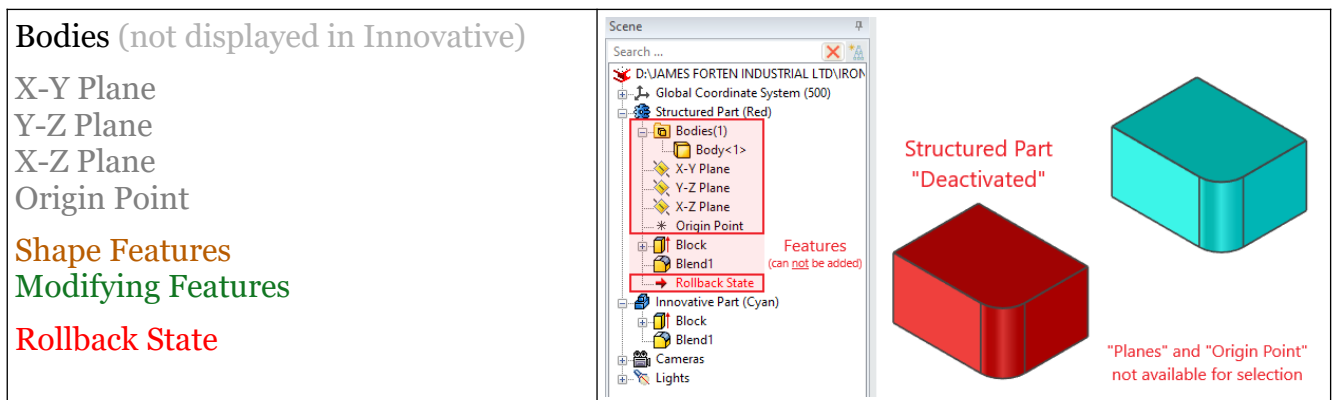
IRONCAD’s default modelling mode is “Innovative Part”. However, located on the “Ribbon Menu” is a tab relating to “Structured Part” modelling.

This tab includes a “**Selection Toggle**”, for controlling whether new parts are created as “Innovative” or “Structured”.

So users can choose the modelling mode most suitable for the part to be created.



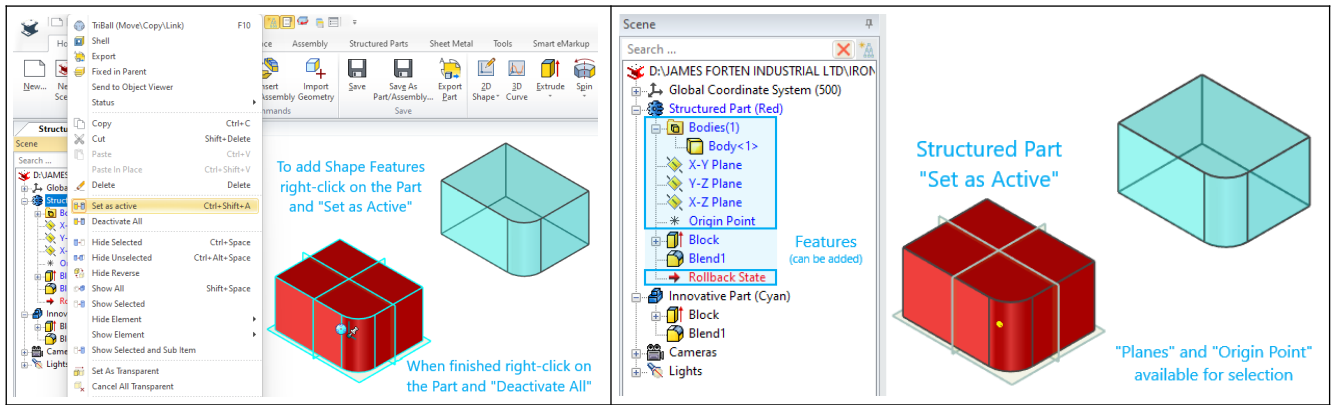
Key Differences between “Structured Parts” and “Innovative Parts”.



Visible Differences within the Scene Browser

Along with the visible differences displayed within the Scene Browser (Bodies, Planes, Origin and Rollback State), another key difference relates to the addition of “**Shape Features**” within the Part. It is first necessary that the Part is “**Set to Active**”. To do this, right-click on the Part and select from the context menu. While a Part is “Active”, it isn’t possible to add “Features” to other Parts within the Scene, so when complete right-click and select “**Deactivate All**”.

When “**Set as Active**”, the “Planes” and “Origin” of the Part become visible (and are available for selection), whereas other Parts in the Scene are made transparent. These other Parts are selectable for some tools (like projecting 2D geometry), but not for others (like trimming).

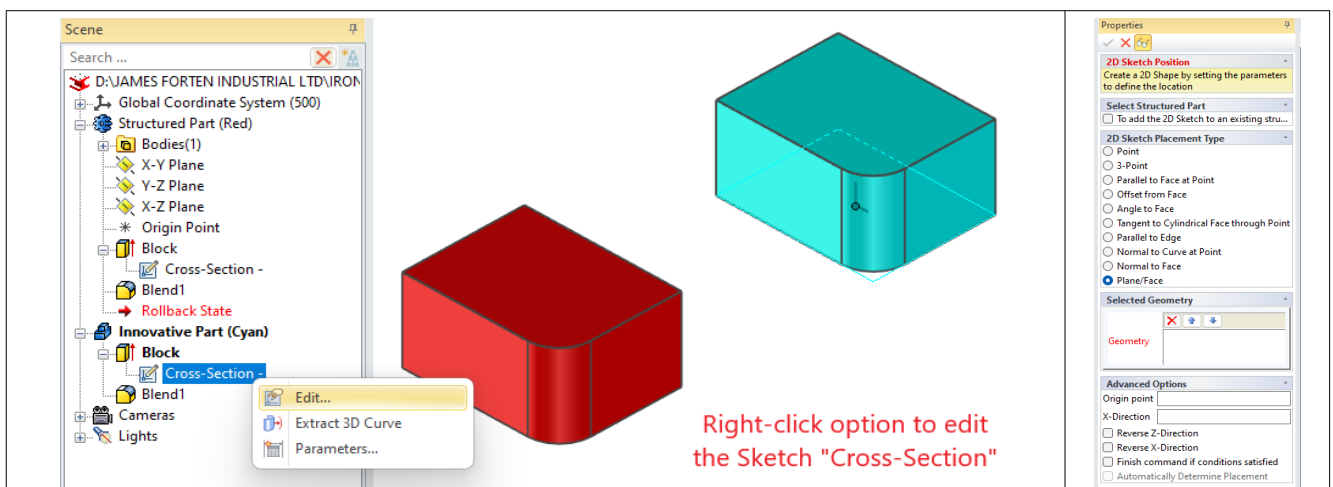


The order in which "Features" are added to a "Structured Part" is important. When adding a new "Feature" (with the part "Set as Active"), the new "Feature" will be added at the location of the "Rollback State" (which can be dragged up and down). "Features" above the "Rollback State" are visible and selectable when creating new "Features". However, "Features" below the "Rollback State" aren't visible or selectable (this is advantageous for complex models).

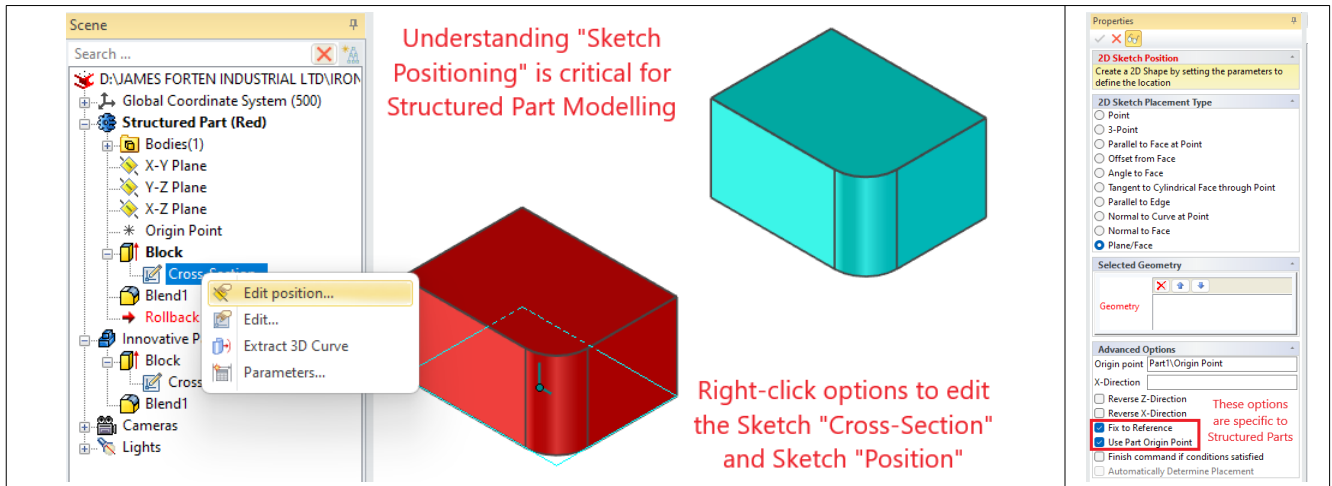
"Shape Features" are those features able to exist without other features, and include 2D Sketches, 3D Curves, BREPs, Extrude, Loft, Spin, Sweep and Thicken. These are typically defined by 2D sketches. The exceptions being BREPs and Thicken (which is defined by a surface within Structured Parts rather than a sketch).

"Modifying Features" require an existing Shape (to modify). These include Blend, Boolean, Chamfer, Draft, Shell, Trim, as well as the Direct-Face Editing tools (such as Delete, Match, Move, Offset, Radius and Split). Whenever possible, these should be applied after all of the "Shape Features" have been created. One of the reasons being, that with complex models it's beneficial to be able to "Rollback" to display (and export) only the "Shape Features".

When "Shape Features" are added to an "Innovative Part" these "Shapes" can be manually repositioned using the "TriBall". This is not the case when "Shape Features" are added to a "Structured Part". That's because the underlying Sketch of any "Shape" becomes associated with whatever it's dropped upon. Whether that be a "Plane" or face of an existing "Shape". Because of this, it's critical to understand how to set and edit the "Sketch Position".



Innovative Parts (sketch editing options)



Structured Parts (sketch editing options)

Because all "Shapes" within a "Structured Part" are intended to be associated (constrained) relative to each other, a "Coordinate System" (consisting of "Planes" and "Origin") is included within the Part itself. These "Datums" are useful not just for "Sketch Positioning", but also for operations as well (such as Patterning and Mirroring). Additional "Datums" (Axis, Plane and Point) can also be added within the feature structure for additional referencing purposes. A typical example being an "Axis" for "Circular Patterns", where no suitable geometry exists.

Because of how the underlying "Sketches" of "Shapes" are associated (constrained), this limits how the "TriBall" can be used for manually repositioning "Shapes" within a "Structured Part".

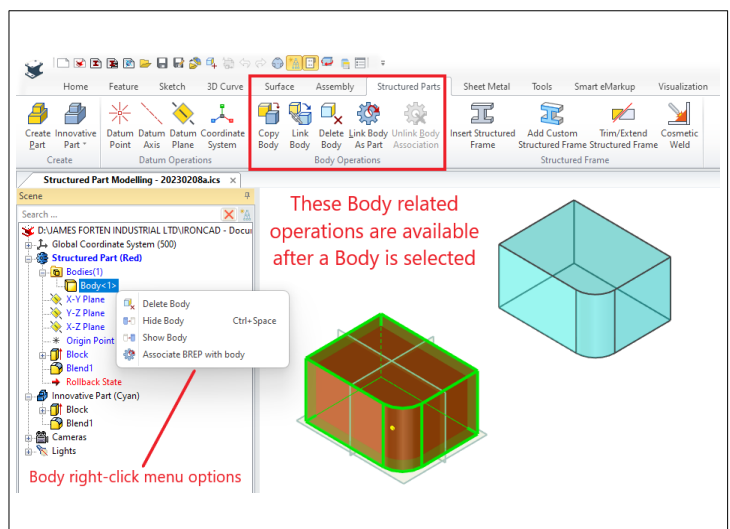
If we were creating a mechanism where the various Parts needed to move relative to each other in a defined way, then "Constraints" would be added between the Parts to achieve this. The principle is similar with "Structured Parts", where the various "Shapes" are deliberately constrained to each other (or Datum Planes, etc...). This is beneficial when editing features within complex models, because any associated features will automatically follow.

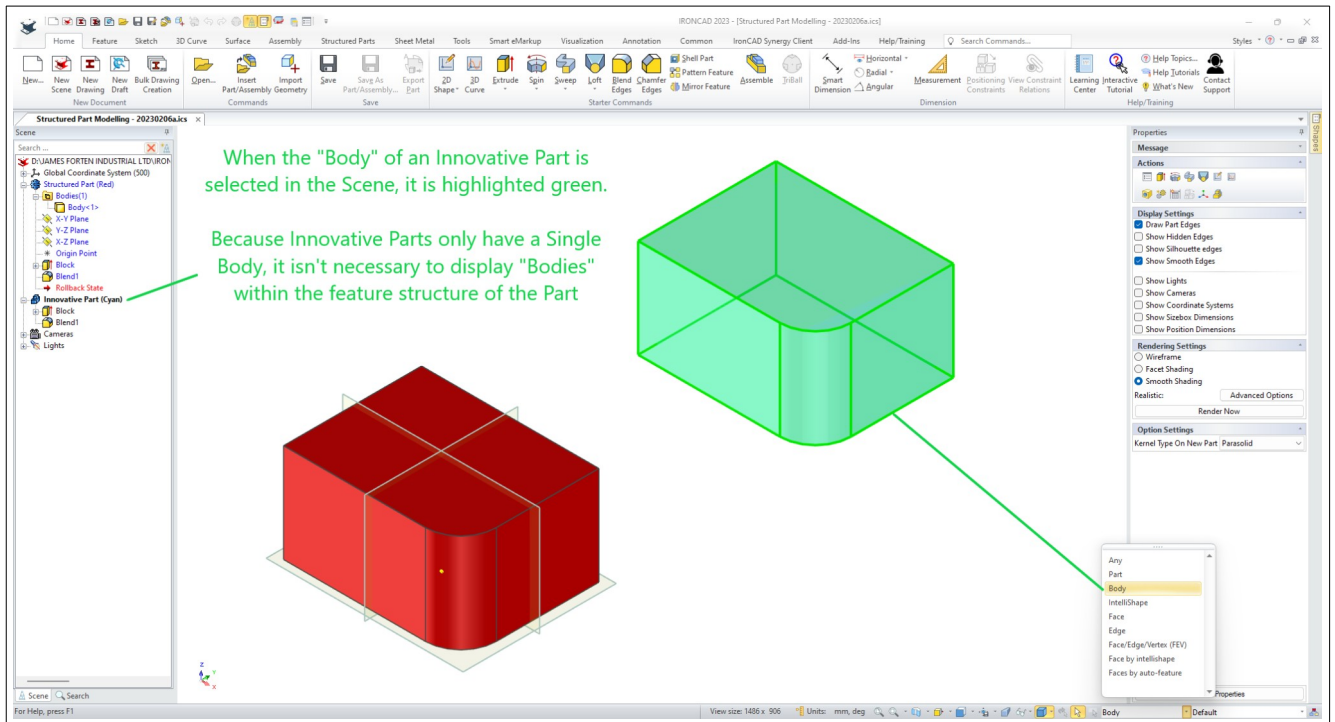
Innovative Parts: Shapes not constrained. Manual positioning of Shape using "TriBall".
Structured Parts: Shapes constrained. Positioning of Shapes using "Sketch Positioning".

Structured Parts introduce an additional selection "level" called "Bodies". These can be either solids or surfaces.

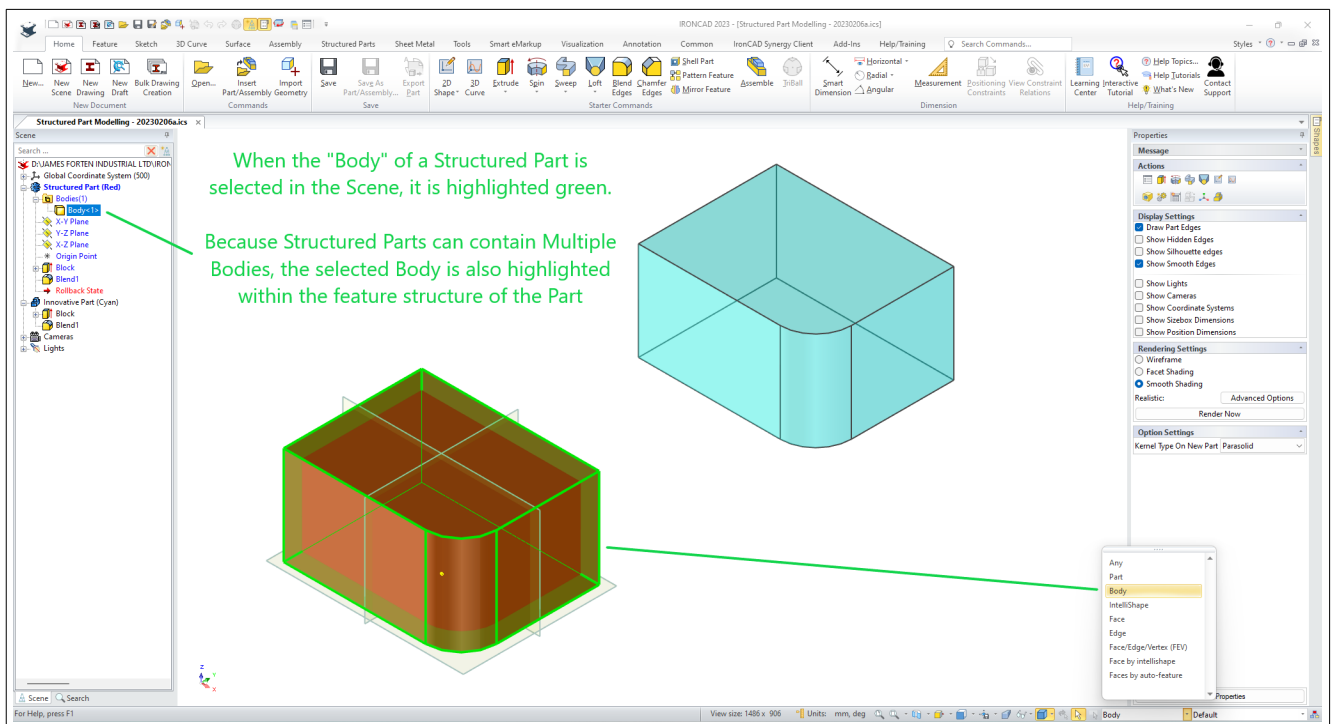
"Parts" consist of one or more "Bodies"
 "Bodies" consist of one or more "Shapes"

When the first "Shape Feature" is added to a Structured Part, a "Body" is created. When subsequent "Shape Features" are added, these can either be added to an existing "Body", or create a new "Body". This is controlled in "Feature Options" using "Apply to given body".

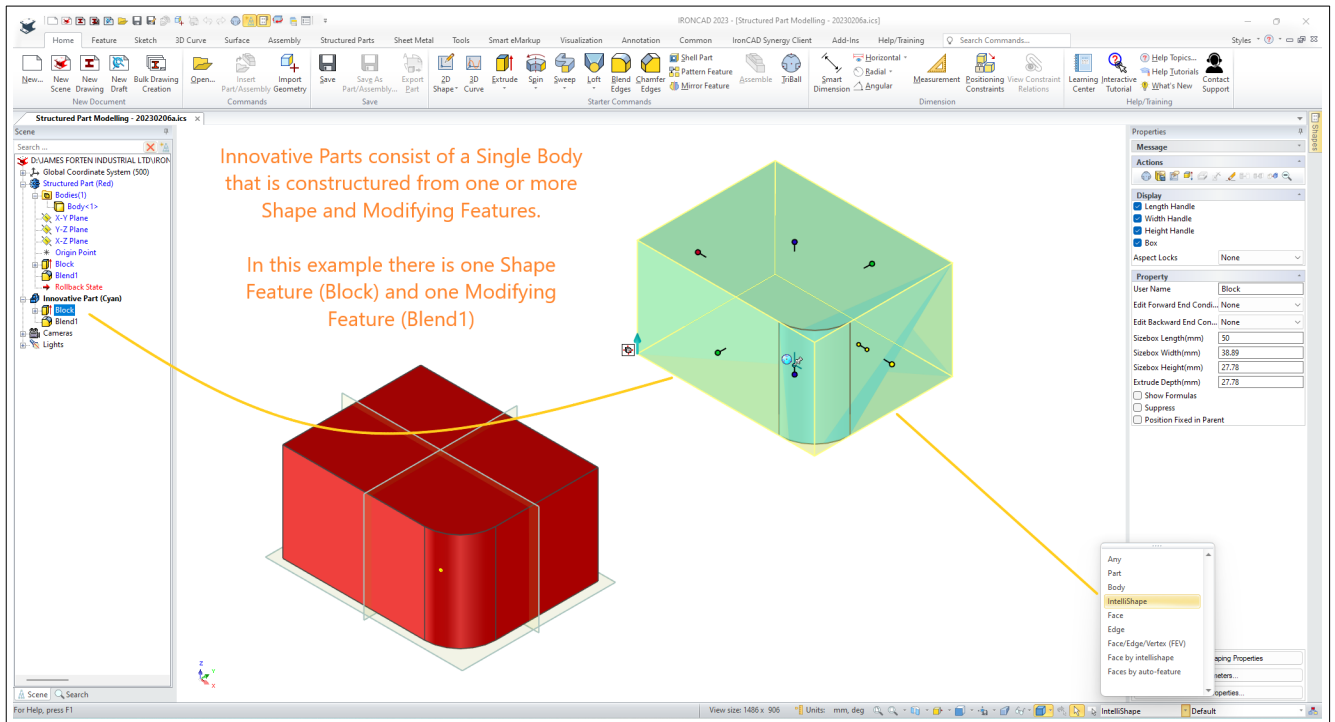




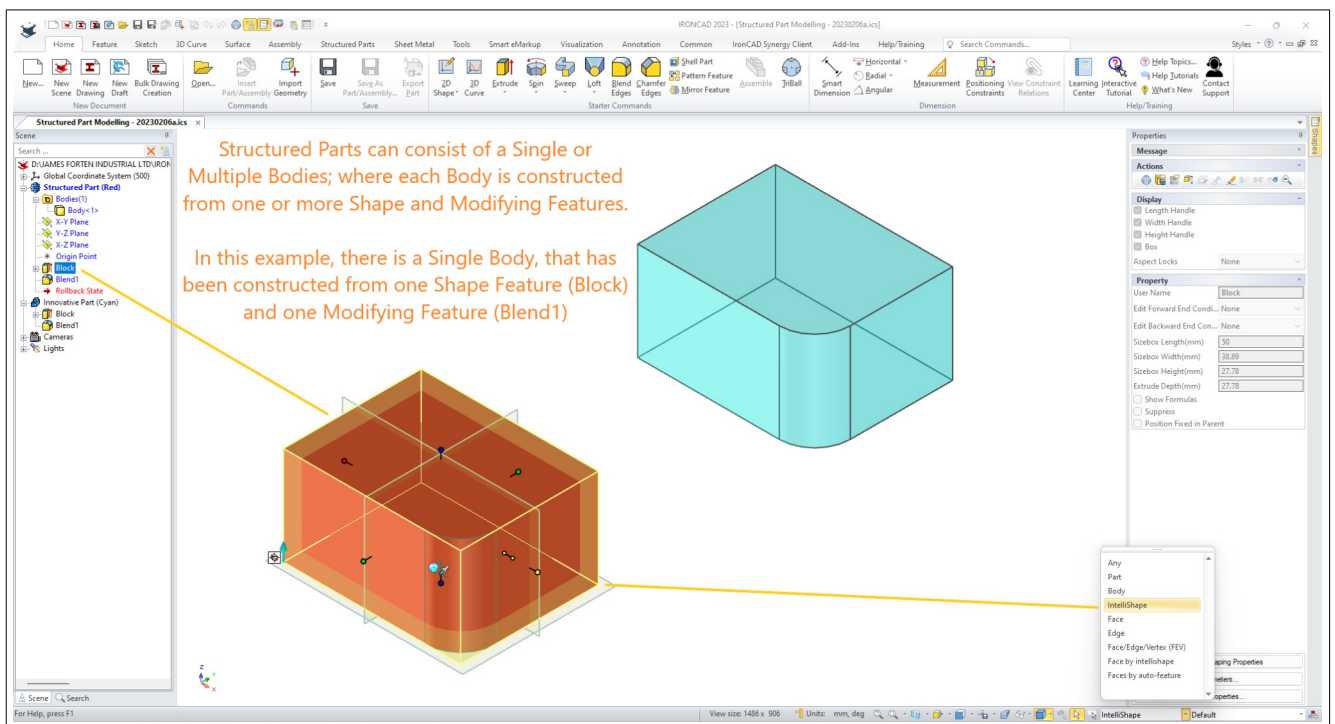
Innovative Parts (selecting body)



Structured Parts (selecting body)



Innovative Parts (selecting features)



Structured Parts (selecting features)