Time	Demo	Script
	Open 3 separate BricsCAD sessions: 1) STARTFILE.dwt Villa_Geometry 2) All Gemini building dwg's (not the sheets!) & open the project browser, turn SHOWDOCTABS = OFF 3) SpiralTower_Assembly_10 T_EntryBase_8 T_Plan_lvl37_4-base Save STARTFILE.dwt as Villa.dwg Make sure Modern Villa/RFA folder is set in COMPONENTSPATH Put bim.cst & classifications.cst in your supportfolder	
Section 1: From concept to BIM		
00:00	- Quickdraw (QD): 12000 x 16300 - Tab x3, 4500 , Tab, break out, Tab, 15500, Enter - Create 2 new walls inside - Split room into 2 (align second wall with existing wall) - Break in corner - Create new wall - Break in part of room	We'll start from a blank screen to explore our design ideas. An important thing to note is that any direct modelling tool can be used at this point; you can start from a cube and sculpt your way to your design. In this case we'll use Quickdraw to quickly layout an initial idea of the layout of the first floor.
00:45	- Press '+' sign - Esc to leave Quickdraw - Offset edge between two floors: 1100 - Extrude boundary (Ctrl x2) over entire length - Extrude boundary inside parapet wall (Ctrl x2) - QD: Tab, 18000 x 2000, left click, draw rectangle larger than house footprint - Break in part of wall	We'll start chipping away at this second floor here until we get something we're satisfied with. I'm using well known direct modelling tools such as Extrude and Push/Pull to transform the model into something we can work with, in combination with Quickdraw to lay out some more walls.
01:27	- Push/pull top of low wall (snap to new wall) - Delete small corner - Connect two walls - Push/pull wall segment - SLICE wall - Connect two walls	Again, using Push/Pull to adjust the height of this wall here, and using some smart modelling tools such as connecting these two walls to make an L-connection.
01:52	- Extrude wall segment (Ctrl x2) - Extrude wall segment	
02:01	- BIMDRAG wall - QD: create new room - BIMDRAG some more walls	We can easily move around these walls, maintaining the connections with other walls and automatically changing them along where necessary.
		We can continue modelling and sculpting this design further, but I think you get the idea; you're completely free how to get there in the end, we just try to make it as intuitive as possible. Let's say

		we are a bit further in the process and we end up with something like this:
02:39	- Open Villa_Geometry - Open components panel/Doors - Insert Door Rollingup (Dyn_dim: 1000 x 0) - Offset edge on back side - WINDOWCREATE on boundary	If you're wondering how these windows got there: there are several ways to do so. One way is to insert them from the components panel. Note that these are parametric, so you can easily change the geometric values such as height, width, frame thickness and so on. Another way to create windows is on the fly: we'll demonstrate this by offsetting this edge, and using this boundary with an irregular shape to create a window. This window is also parametric as you can see from its properties.
03:18	- Open structure browser - Select an element and show its properties	Ok, so at this point we've only been working with geometry. The direct modelling tools we've used don't necessarily know that they are creating walls, slabs or other element types. If we select an entity we'll see it's just a 3D solid, with only CAD properties. The structure browser only shows solids and block references. We can start to manually classify each entity one by one but honestly, who has time for that? That's where artificial intelligence comes in. We've developed a tool to BIMIFY a geometrical model.
03:54	- BIMIFY - Select all and click OK - (Delete line) - Make sure active .cst is classifications.cst - Show classifications, show room area & volume, isolate walls	BIMIFY is now analysing the the model and based on its geometric features, is automatically adding classifications, detecting spatial locations such as buildings and floors, detecting rooms, which walls are internal or external, and so on. In just a second, the software has done all this tedious work for us. We can see now in the structure browser that we have different building element types, rooms with their areas and volumes. We can quickly isolate the walls by way of example.
04:44	- Switch to bim.cst - Activate section - PLAN enter - Select internal walls in structure tree - Open compositions panel and filter on only compositions that are used in this drawing - Drag & drop Interior Wall composition - Switch reference face of 1 wall - Enter - Select external walls with thickness 250 - Drag & drop Exterior Wall composition (make sure you don't accidentally apply it to the site slab as well!!) - Show that wall thicknesses and room areas have been updated	We also see that automatically two floors were detected, and all the entities were assigned to the correct floor. Let's activate this section. We see that no materials have been assigned to the walls yet. We can easily select a set of walls from the structure browser; in this case we'll select all the interior walls and apply a composition to them by dragging and dropping from the compositions panel. In this case, the wall solids have a thickness that is different from the composition thickness. We can for each wall choose a reference face; this face will stay in the same position, whereas the other face will shift if the wall needs to get thicker or thinner. We'll switch the reference face of this wall here, and accept; all the walls are now being updated. Notice that their thickness changes, and the room areas are updated as well. We'll do the same for the exterior walls. Now we see all of the different composition plies and their materials.

06:19	- Filter in structure tree: $type=wall and (Height < 2000 or Height > 4000) - Select all filtered items - Apply Concrete Blocks composition - Switch references faces where necessary (should always be the outer face) - Enter	You've see me use the structure tree to browse through my project, but it's also possible to do more powerful queries. For example I want to find all the walls lower than 2m or higher than 4m. We'll just quickly add some compositions to these elements.
06:52	- Create new section - Apply Floor slab composition and Flat roof composition to the slabs	Ok, let's create a vertical section. We see that the floor and roof slabs don't have a material yet. We'll just drag and drop some materials onto them.
07:16	- Create floor-wall detail: - Pull concrete layer boundary - Pull face of floor slab through wall finishing - Pull site solid face - Pull on boundary to create hole (300 high) - Extrude on boundary to create new solid - Drag & drop Cellular Concrete composition onto new solid	We see that the connection between this wall and slab is not how it would be designed in real life. We can again use the same direct modelling tools as we did before to create any detail possible. Just push/pulling some faces allows us to very quickly design this connection. We will also include an extra solid: a structural insulation block to avoid having a thermal bridge at this connection.
08:17	- Zoom to other side to show original situation - Select floor site, wall and slab (make sure you don't accidentally select the room hatch) - Launch Propagate Planar - Check the blue question mark - Zoom to other side to show updated situation	Now we've designed this detail over the entire length of this wall, but we don't want to do this for all the walls separately. No worries, we can propagate this detail through the rest of the drawing. We'll just select the elements with the desired detail and launch propagate. This will scan the entire model for situations where this particular detail can be applied. Each green check mark represents such a location; we can turn off suggestions individually, but in this case we'll accept everything and press OK. If we now zoom back to the other side of the building, we see that this detail has now been applied here as well! This just saved us a lot of time.
09:07	- Delete section - Insert Roof Edge Detail block - Explode - Extrude - Change color so it's more visible - Highlight wall - select Propagate Edge - Choose roof cap solid as detail - Check blue question mark - Enter - Pan around a bit	Propagate is a very versatile tool that can be used for many situations. In this case we will model a simple roof cap by extruding a polyline. Now we want this roof cap to be applied on all roof edges. Again, we will use propagate for this; I'll accept all the suggestions. Let's look at the results. We see that the roof cap is applied everywhere, and the corners have been solved nicely as well.
10:27	- Create new section - Open components panel/IKEA folder - Insert Tables/Grimle_table - Insert Storage/Expedit	Let's get inside and take a look at some components. We have an in-house library of components of different categories such as doors, windows, furniture etc. It is of course also possible to create your own components, and since V19 it's also possible to import Revit Families! Just add the

		folder with Revit Families to the search path and they will appear in the components panel. We'll insert some Revit Families of IKEA furniture that were found on an open online platform.
11:15	- Delete section - Pan to back - Insert NBL/Doors/Custom_Door - Show that it has no parameters	Here we have another example of an imported Revit Family. Note that this Family has no parameters, it was a purely geometrical model without constraints.
11:51	- Open copy of door - Show mechanical browser - Turn on Subtract layer - Parametrize everything - Turn off Subtract layer - Show mechanical browser - Animate Length_X - Rename it to Width - Animate p_20 - Rename it to Height_MB - Save as Door_Parametrized	We can easily add our own constraints. Let's open a copy of this door. In the mechanical browser we can see no parameters or constraints, but using the Parametrize tool we'll be able to turn this into a fully parametric model in no time. We can see now a whole bunch of parameters with very vague names. To identify which parameter triggers which change, we can animate it. Here we can see that this parameter changes the width of the door, so we'll rename this parameter to Width. Let's to the same for another parameter.
13:10	- Replace door in villa model - Change Width to 1500 - Change Height_MB to 800	We can now save this door, and replace the original door in de villa model. Changing the value of these parameters obviously updates the model.
Section 2: Design Documentation		
13:47	- Open Gemini Building - Show the different models inside the project - Open Gemini Building_Level 3 - Show the sections - Show the Sheets - Open A-103 - Open A-301 - Open A-106 - Add automatic tags on floor plan - Pan around to show different tags - Update Flow Terminal Schedule - Update Furnishing Elements Schedule - Display Schedules - Pan around - Update Window Schedule - Pan around	We'll open a different model to show how design documentation works in BricsCAD BIM. This is a larger model that consist of different Xrefs, generally one per floor and maybe a different Xref for the canopy design. We can also find all the different Xrefs here in the project browser on the left. For example let's open the third floor of this building. The project browser also shows all the sheets that are associated with the project; here we have a sheet with a couple of floor plans, this is a sheet with some section views. Let's add some annotations to one of the floor plans; tags can be added manually or automatically. These tags show information about the element, for example a room tag, column tag containing profile information, or stair tag containing information about amount of risers. These tags are completely customizable, and of course are fully associative, so if you make changes in your model, the tags will be updated as well. We can also add schedules about the model, for example a flow terminal schedule or furnishing element schedule of the third floor. You're completely free which information to show in these schedules, and they are also updated when a change is made in the model. Let's add one more schedule for windows.

Section 3: Multidisciplinary Design		
	Note: you can pick parts of this section to show the client, depending on what their needs/interests are. For example an HVAC engineer might be interested in the part about MEP modelling but not so much in site creation or façade design. This way you're not wasting time showing features that are irrelevant to the situation	Let's talk a bit about the different disciplines in a construction project. Whether you are an architect, an structural engineer, MEP engineer or façade designer, you will be involved in the BIM process one way or another. BricsCAD BIM provides a basic toolset for each of these disciplines to be included in the process.
17:36	- Open Spiral Tower Assembly - Orbit around - Show Xrefs	This is a model of a large tower, and again consists of different Xrefs. Let's open one of these drawings.
3.1: Structural Design & Grids		
18:05	- Open one of the many identical Xrefs - Radial Grid - Snap to Node - Tab, change cell length to 6 - Hold shift for temporary ortho mode - Left click when radius = 36 - Tab, change cell angle to 15° - Finish grid - Refedit - Remove lines - Trim lines - Remove 1 more arc - Refclose - Set the grid to layer: Grid_Radial	Let's say we want to add some structural columns to this model. We'll start by defining a grid. Because of the circular floor plan, obviously we'll need a radial grid. Once the basic grid is in place, we'll start to manipulate it. This can be done by using Refedit and manipulating the 2D lines and arcs like you would any 2D entity. Using tools like move, copy and trim you can create custom grids.
19:12	- Create circle on grid intersection: radius 0.3 - Extrude downward 0.08 - Extrude upward (snap) - Open profiles panel and filter on structural steel, AISC - Circle Hollow: HSS 406.4x9.5 on grid intersection - Height 3.5 (use Ortho mode) - I-shape: HP 250x85 - Height 3.5	Before adding the columns, we'll make a column base. We provide a profile library with all of the most used structural steel profiles, which you can just drag and drop onto your canvas. In this case we'll draw a circular hollow profile, with inside it an I-shaped column.
20:32	- Highlight floor slab - Start Propagate Pattern - Explode Grid - Deselect 12 of the inner columns - Accept - Isolate floor slab to show that the holes were made in the slab as well - Check again whether Grid is on layer: Grid_Radial - Save file - Go back to main model and zoom in - Show that there are no columns - Enter XR - Reload Xref T_Plan_lvl4_2 - Show that there are columns	If we want to have this column at every grid intersection, you could copy them manually or create a polar array, but the fastest way to do so is again by using propagate. It automatically detected this grid on top of the slab, and knows it should apply this column on every grid intersection. We can still manually turn off suggestions of course. If we isolate the slab we see that not only the columns were copied, but also the voids for the column bases were made. Let's save this file and go back to the master model. Updating the Xref of this floor, we see that now all of the floors have the columns in place.

3.2: Curtain walls		
22:25	- Open T_EntryBase_8 - Loft 4 splines - BIMCURTAINWALL - Choose lofted surface 4x2m Planarize: Yes Deviation: 0.01 W: 0.1 D: 0.2 G: 0.01 S: Y Enter - Orbit around to show panels - Save file and go back to master - Reload file	For V19 we developed a curtain wall tool. Of course curtain walls can be applied to flat faces and rectilinear grids, but it's more fun to do so on a free form surface, like the one I'm creating here by lofting these splines. Applying the curtain wall tool on this surface, we're prompted some options such as frame depth, glass thickness and so forth. Let's save and go back to the master file.
3.3: Site creation and Gradings		
24:15	- Zoom out - Create site: Import from file: DemoSurface.txt - (Show contour lines) - Turn on layer: _ParkingLayout - Select polyline - Create grading - Click site - Move mouse around to show real-time grading preview - 30° - Grading properties: turn on boundary - Show net volume that is calculated	We've also added a basic toolset for site design; you are now able to import a coordinate file to create a TIN (triangular irregular network) surface. We can start manipulating this surface, or add gradings. For example if we want to create an elevated platform for our building and a parking area, we need only select this polyline and create a grading. We can dynamically choose the angle of the grading, or enter a precise value. Turning on the boundary of the grading we can see the net volume that needs to be added or removed to create it.
3.4: MEP Modeling		
26:19	- Open T_Plan_lvl37_MEP - Orbit around - Open profiles panel - Filter on HVAC - Rectangle: 12" x 8" - Start: midpoint of rectangle - Turn ORTHO on - Q for quarter turn - Up 3.5 - Left 3.5 - Horizontal 21 - Zoom to automatically made connections - Connect two other segments to main duct	Another discipline is Mechanical, Electrical and Plumbing. We've added a generic toolset to be able to model flow segments, flow fittings and more. We'll open the profiles panel again, and this time filter on HVAC profiles. We can again drag and drop a profile onto our canvas, and start drawing like we would lines. Note that these flow segments were automatically connected with flow fittings. We can also manually connect other segments to each other.
27:50	- BIMLINEARSOLID - Pick in model - Choose the flow connection point - Draw duct of random length - Connect duct to main duct - Ctrl to cycle between options - Connect all of the others at once	Notice that these ventilation units have flow connection points associated with them. This flow connection point contains information about which profile should be attached to it, so if I start drawing a linear solid and click on this connection point, I automatically get the correct profile. We can now connect this segment to the main duct; we're presented with a couple of options which we can cycle through using the Control key.

		Let's connect all of the other ventilation units to the main duct as well. Two clicks and we're done!
29:00	- XR - Turn on structural xref - Show interference between MEP and structural - Multislice - BIMDRAG up to show that the ducts move along with it - BIMDRAG down: 0.23 - Show that it's no longer interfering	Of course the interplay between different disciplines is very important in the BIM process, for example for clash detection. Let's turn on the structural model for this floor; we'll see that the main duct is interfering with the ring beams. No worries, we can just slice the main duct, and move it up or down a bit so it fits the design. Notice how all of the connections are maintained when I try to drag the duct upwards. Ok, let's check whether the beam and duct are still interfering. The clash is solved!