# OPTIMISATION – FACADES [The Crest]

**Design Optimisation of Artwork Facade Panels for The Crest Apartments**

Tags: Optimisation, Form Finding, Facades, Grasshopper, Sheet Metal, Design to production, Fabrication, Galapagos, Evolutionary Solver

Brief:

Article:

Here at if/LAB we believe in using the right tool for the job, and when it comes to design, there’s no going past *Rhinoceros 3D and Grasshopper 3D*. The current climate of the AEC industry sees clients demanding more, in a shorter turnaround time, for less money and one way to keep up with these demands is by implementing computational design into your practice. The adoption of computational design enables smaller teams of designers to compete with the larger practices, by implementing digital workflows into their everyday. This is also true for fabricators who will inevitable find themselves pressured by demands for realising complex geometry and advances in technology.

So why should you optimise? He is an example of a recently completed, integrated public artwork façade, that we delivered from design to fabrication, using Rhino and Grasshopper.

**Design**

The flexibility of *Rhino and Grasshopper* enabled us to quickly and iteratively test numerous concepts, whilst having the ability to know exactly how many pieces would be required and what the estimated cost would be. Traditional design methods typically involve shorter allocations of time for design, and more time allocated to documentation. Computational design flips that relationship, allowing designers to spend more time designing and less time documenting.

(DIAGRAM OF TRADITIONAL VS COMPUTATIONAL)

Our workflow for the Crest Apartments artwork facade allowed us to quickly explore different parameters and any resulting implications they may have on the aesthetic and production of the facade. With a simple slider, we can test panel heights, widths and depths, comparing the aesthetics with the logistical data outputs relevant to fabrication and installation. Ie. total number of panels vs number of unique panels, total surface area vs material wastage etc.

(INPUT SLIDERS HERE)

**Production**

By working closely with the fabricators and understanding the parameters around which the concept was conceived, we were able to evolve our design proposal into something far more efficient, and therefore, affordable. How? By using an evolutionary solver within Grasshopper to optimise our façade panels to reduce the number of unique panels required, which in turn, speeds up the fabrication and installation processes.

It is unrealistic to expect an individual to manually iterate through every possible parameter, so instead, we let the algorithm run through tens of thousands of possible scenarios until it arrives at the optimum, removing any laborious, repetitive work from the equation.

After an in-depth design exploration process that resulted in a visually appealing outcome, the chosen parameters, including overall panel height and width, were used in the optimisation algorithm to rationalise the design. The result went from 15 unique panels to 4 unique panels.

(IMAGE OF MULTIPLE TYPES VS IMAGE OF OPTIMISED TYPES)

SCREEN RECORDING OF OPTIMISATION