SELECTED WORKS

CONFIDENTIAL PORTFOLIO
This document contains proprietary work examples and is intended solely for professional evaluation.
Projects under NDA are presented in abstracted form without client identification, internal data, or branded content.
Sharing with prospective clients for evaluation is permitted

PROJECT PLG:
PARAMETRIC LATTICE GENERATOR

Interactive real-time lattice generator implemented using JavaScript/WebGL is available at: www.dimiale.com

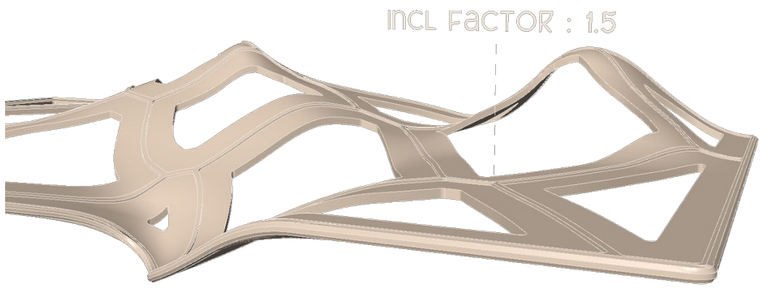
Problem

Performance footwear development requires systematic exploration of lightweight lattice structures (hexagonal, quad, rhombus, triangular cells) for FEA simulation, limiting design exploration to 5–10 configurations per day considering manufacturing constraints (volume limits, symmetry requirements).

INPUT	PROCESSING	OUTPUT
Target BREP surface zone	Surface unfolding to planar domain	800 simulation-ready meshes with associated geometric data
cell count (X/Y)	curve network generation via parameter-based splitting	
inclination angle (cell type)	data tree masking for cell polyline construction	
cell wall thickness	projection to double-curved geometry	
cell fillet radius	offset + fillet operations	
volume constraint	Boolean carving	
	volume validation	
	batch mesh export with metadata	

Solution KPIs (120h development)

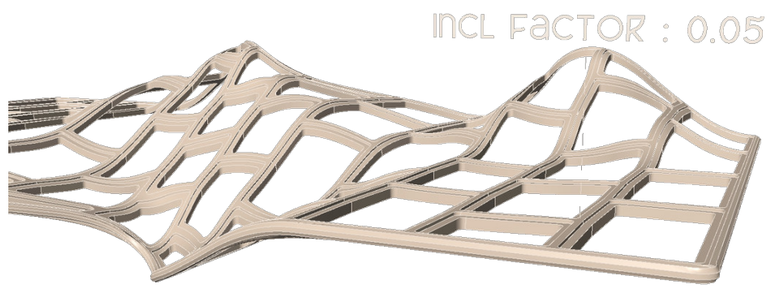
Time reduction :
40-80 minutes → 2–3 minutes per variant
Design exploration :
5–10 manual variants → 800 systematic variations
Material efficiency :
20–40% weight reduction while meeting strength requirements



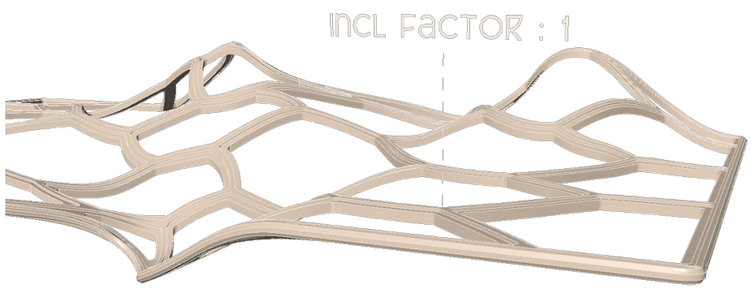
columns : 3 / rows : 6 / factor : 1,5 / thickness : 4



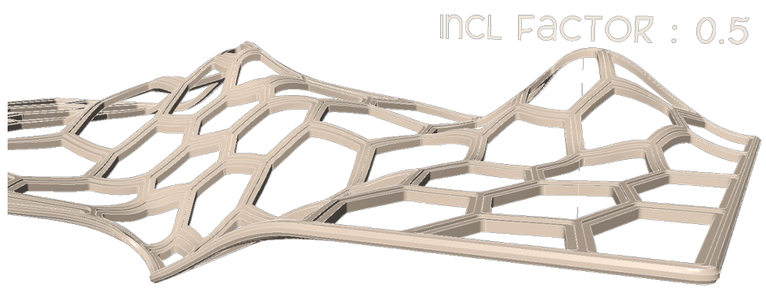
columns : 12 / rows : 8 / factor : 1,95 / thickness : 4



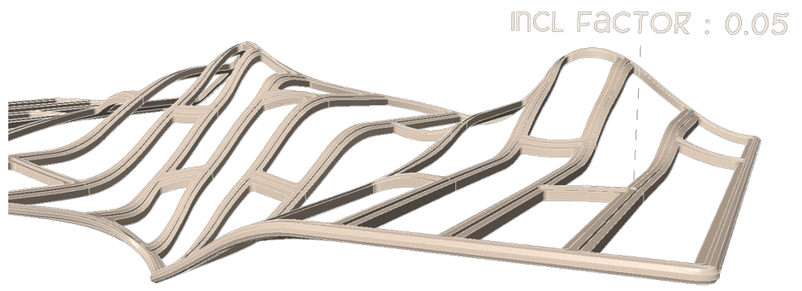
columns : 12 / rows : 8 / factor : 0,05 / thickness : 1



columns : 7 / rows : 6 / factor : 1 / thickness : 4



columns : 12 / rows : 8 / factor : 0,5 / thickness : 1



columns : 3 / rows : 14 / factor : 0,05 / thickness : 2

Transferability

Applicable to aerospace wing structures, automotive crash absorption components, medical implant lattices, architectural facade systems, protective packaging optimization—any domain requiring lightweight structural performance.

Technical Implementation

Pattern generation on complex double-curved surfaces with enforced bilateral symmetry. Integrated Grasshopper Hops for accelerated batch processing. Python handles fillets operations (it stabilizes) and mesh export with embedded simulation parameters. Gradient-based manual optimization enabled through rapid regeneration after FEA analysis.

PROJECT OSM:
ORGANIC SURFACE MODELING

Problem

High-quality pattern-based surfaces require manual surface construction with attention to blend transitions, surface curvature continuity and manufacturing constraints, such as for all types of advanced manufacturing.

INPUT

- base sub-surface
- wave source point
- wave frequency
- wave amplitude
- blend zone width

PROCESSING

- translation of UV domain into point grid
- circular boundary trimming or domain remapping to disc
- mathematical function evaluation per vertex
- vertex move along Z by computed displacement values

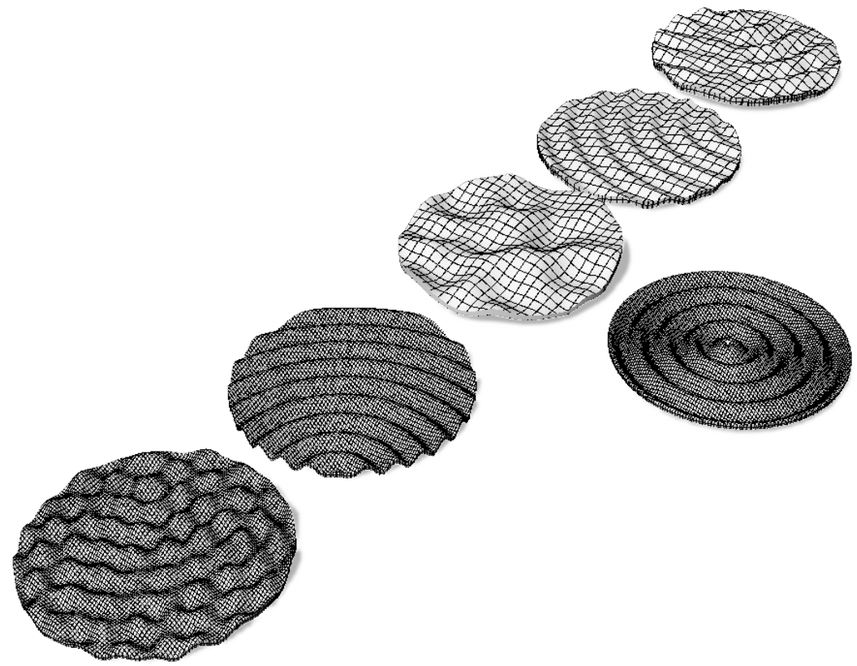
OUTPUT

infinite geometric configurations of production-ready solids

Solution KPIs (8h development)

Time reduction :
30min per organic surface variant → instant regeneration
Pattern exploration :
5 manual variants → 100+ validated pattern options
Blend quality :
Achieved G1 continuity across organic-to-rigid transitions





Transferability

Applicable to medical/dental device surface modeling, ergonomic product housings, organic form blending for consumer electronics, injection-molded decorative components

Technical Implementation

Wave propagation algorithm on double-curved NURBS with G1/G2 blend surface construction between organic and rigid zones. Automated curvature validation and manufacturing constraint checks (overhang limits, wall thickness for FDM).

PROJECT SFP:
SURFACE FEATURE PLACEMENT SYSTEM

Problem

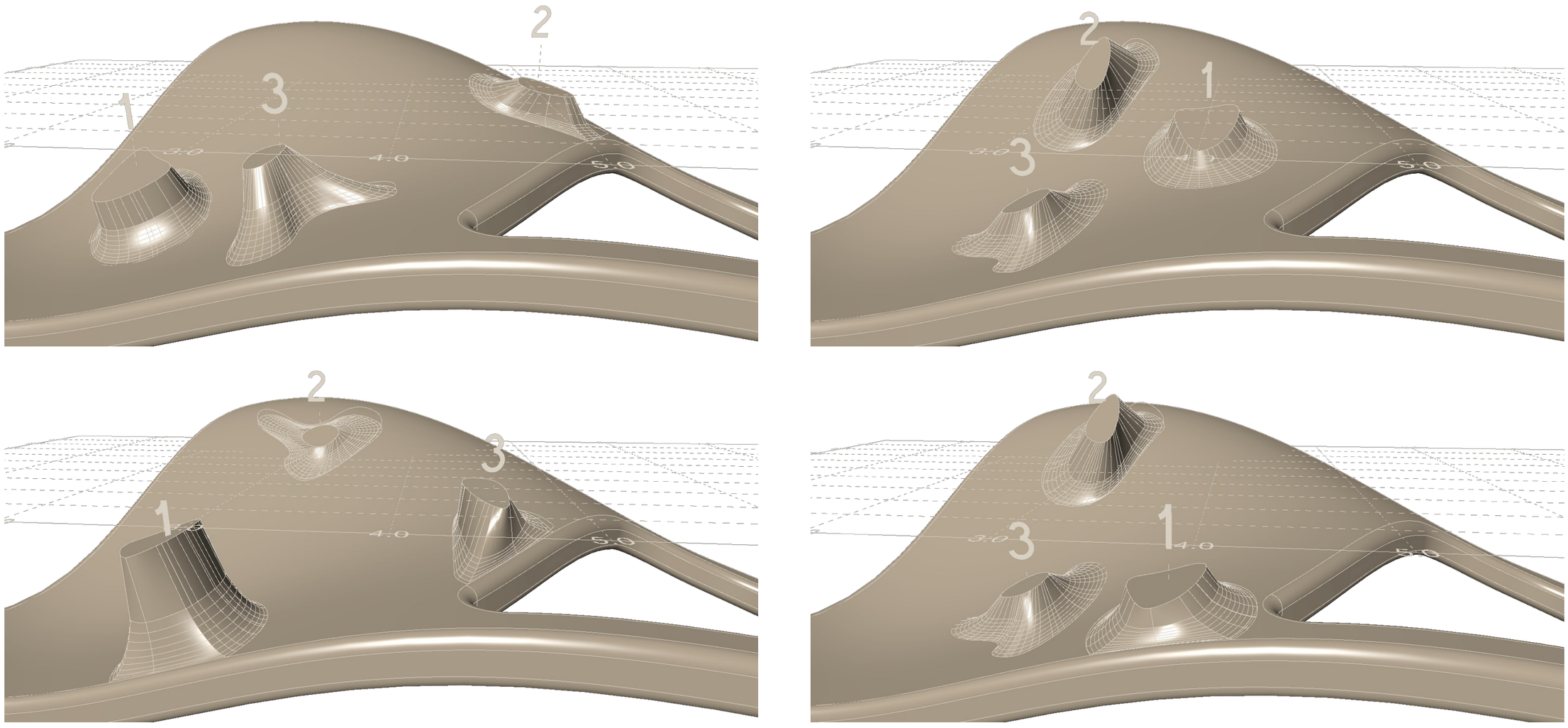
Functional surface protrusions requires manual modeling for each geometric variation—adjusting position, height, rotation, tip shape, and blending for every design iteration. Manual workflow prevents systematic exploration of grip patterns and makes design iteration impractical for projects requiring dozens of variants.

INPUT	PROCESSING
relative XY of the bump	tip profile curve placement on tangent plane
user-drawn tip shape	offsetting + bottom seam projection to surface
tip inclination (Z. vs. N.)	curve tweening + takeoff + curve reparameterization
protrusion rotation	graph-mapper-based lofting
protrusion height	surface trimming + Boolean integration
surface blending type	automatic closure to solid

OUTPUT: infinite geometric configurations of production-ready solids

Solution KPIs (180h development)

Time reduction :
2-3h per configuration → instant regeneration
Iteration capacity :
3-5 concepts per day → 50+ variants per day
Performance quantification :
Automated geometry estimation + sorting for traction analysis



Transferability

Core placement logic applies to: ergonomic grip surfaces (power tools, medical devices), thermal management (heat sink fin placement), mold cavity design for functional patterns, anti-slip industrial safety equipment.

Automated Analytics

System generates performance statistics per feature: wall surface area, directional surface area (Y-axis projection for traction analysis), geometric validity checks. Canvas-based spatial sorting of protrusions organizes component positioning for structured data export.

Technical Implementation

Generative design system for parametric placement and blending of functional surface protrusions. Handles complex double-curved base geometry with automatic edge-case resolution (features extend beyond base surface).

PROJECT QC:
GEOMETRIC QUANTITY & COST EXTRACTION SYSTEM

Problem

Office fit-out projects required manual extraction of geometric data from CAD plans (areas, work-space counts, spatial categories), followed by cost calculation from market pricing spreadsheets and layout (re-)preparation for client presentations.

INPUT

- Automated office plan geometry (from space generation tools)
- Excel cost database per unit (Standard/Premium/High)
- regulatory formulas + descriptions + disclaimers
- layout sheet dimensions

PROCESSING

- automated extraction of areas and workspace typologies from CAD generated floorplan
- categorization of geometry by construction phase (owner/tenant fit-out, furnishings, technical systems)
- cross-referencing with pricing database
- generation of formatted layout with auto-positioned ta bles and proportional wheel chart visualization

OUTPUT

- client-ready PDF with cost breakdown across 3 pricing tiers

Solution KPIs (80h development)

Update speed :
2-hour recalculation after plan changes → 30 seconds
Error reduction :
15–20% manual calculation errors → <2% automated
Client presentation preparation :
2 days for multiple comparison variants → 10 minutes

Einfacher Kostenrahmen

Durchschnittliche Kosten
Ausbau Eigentümer

	1100 € / m²	1500 € / m²	2000 € / m²
	Standard	Gehobener Standard	Premium
Kosten Eigentümer	1.694.921 - 2.448.219 €	2.448.219 - 3.201.518 €	3.201.518 - 4.331.465 €
Ausbau Deckt die Kosten für die eigentliche Konstruktion des Gebäudes ab, wie z.B. Fundament, Wände, Dach. Sie spanne gibt den Umfang des Ausbaus an.	Kostengruppe **300-700**	1.694.921 - 2.448.219 €	2.448.219 - 3.201.518 €	3.201.518 - 4.331.465 €
Kosten Mieter		**8.123.547 - 9.684.693 €**	**8.585.526 - 10.203.170 €**	**9.104.002 - 10.731.646 €**
Beratung & Strategie Eine kurze Projektanalyse ist Mietern besonders hilfreich, unterstützt die Mitbestimmungsfindung, die Beschreibung Ihrer, den Abgleich der Mieterbedarfsfindung des Eigentümers mit den Anforderungen der Mieter und die Vorbereitung der Ausschreibung in Form von einer Gegenüberstellung der Anfragen des Ihrem Mieterwünschen.	Kostengruppe **700 Baunebenkosten**	10.000 - 20.000 €	20.000 - 30.000 €	30.000 - 50.000 €
Design Wiederverwertet ist der Start vor Abschluss des Mietvertrages um vom Einfluss auf die baulichen Qualitäten nehmen zu können. Es ist aber auch möglich das Design nach Vertragsschluß des Mietvertrages zu erstellen.	Kostengruppe **700 Baunebenkosten**	65.914 - 84.746 €	103.579 - 122.411 €	141.243 - 160.076 €
Netzwerkverkabelung Enthält die Kosten für alle technischen Anlagen im Gebäude, wie z.B. Heizung, Lüftung, Sanitär, Elektrik.	Kostengruppe **400 Technische Anlagen**	150.660 - 188.325 €	188.325 - 282.487 €	282.487 - 376.649 €
Mobiliar & Schreinerleistungen Bei den Einrichtungskosten ist zu bedenken, dass Fabrikware, wie das endfertige Design, die Kraft der Möbel, die Größe des Raumes, und der Standort einen maßgeblich Einfluss auf die Endgültigen Kosten haben. (Flexe Einbauten und total Mietvertrag)	Kostengruppe **600 Ausstattung und Kunstwerke**	376.649 - 564.974 €	564.974 - 753.298 €	753.298 - 941.623 €
Medientechnik & IT Die Kosten für Medientechnik & IT umfassen die komplette technische Infrastruktur eines modernen Büros, einschließlich Netzwerkverkabelung, Serverräume und Sicherheitssysteme. Dabei sollten unbe- dass Mitarbeitende digital, effizient und standortübergreifend arbeiten können.	Kostengruppe **600 Ausstattung und Kunstwerke**	188.325 - 376.649 €	376.649 - 564.974 €	564.974 - 753.298 €
Projektmanagement Ausbausteuerung, Umzug, Design, Möbel, Medientechnik, Strategie & Beratung etc.) über als Mietpartei betreut hat, der Bauer eines Ihres	Kostengruppe **700 Baunebenkosten**	52.000 - 130.000 €	52.000 - 130.000 €	52.000 - 130.000 €
Umzug Die Gesamtkosten beinhalten sämtlichen anfallenden Aufwand für den physischen Transport von Möbeln, IT und Equipment – inklusive Demontage, Verpackung, Transport, Wiederaufbau sowie ggf. Entsorgung oder Lagerung. Sie variieren stark in Abhängigkeit von Unternehmensgröße, Gebäudeausgestaltung und der gewünschten Taktung des	Kostengruppe **700 Baunebenkosten**	7.280.000 - 8.320.000 €	7.280.000 - 8.320.000 €	7.280.000 - 8.320.000 €

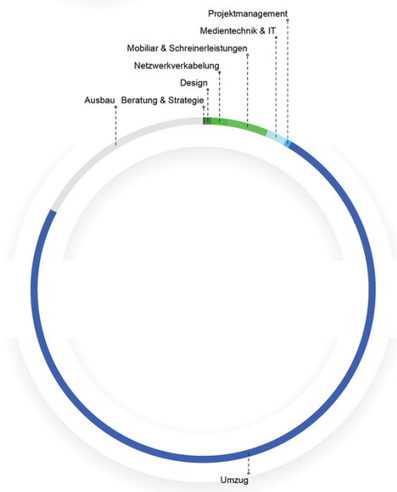
Das QS-Tool bietet einen ersten, transparenten Überblick über alle relevanten Kostenarten, die im Rahmen einer Büroflächenplanung auf Nutzerseite und Eigentümerseite entstehen können – noch bevor konkrete Projektinformationen vorliegen. Der einfache Kostenrahmen hilft dabei, frühzeitig ein Gefühl für die Größenordnung und Struktur möglicher Aufwände zu bekommen.

Im weiteren Projektverlauf wird diese Übersicht zur detaillierten Kostenschätzung weiterentwickelt.

Projekt
Grundlagen

Arbeitsplätze
64

2.140 m²
nach GIF





Transferability

Applicable to residential construction cost estimation, retail space planning budgets, warehouse layout optimization, facility management cost modeling—any context requiring geometric data extraction from CAD for downstream business processes.

Core value is automated geometric data extraction from complex CAD plans—area calculations, spatial category identification, component quantification

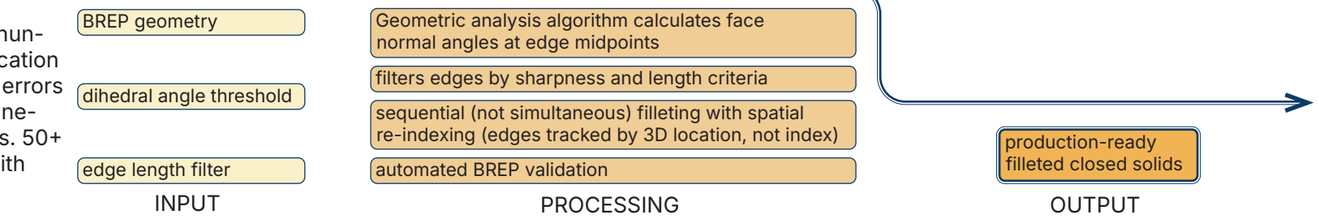
Technical Implementation

Python ensures stable Excel parsing. Grasshopper Pancake plugin enables complex conditional logic for cost categorization. Elefront manages Rhino blocks and smart automated baking for layout generation. System integrates with upstream plan generation tools for end-to-end work-flow. Multilingual layout switching (German/English) via Excel configuration.

PROJECT EFS:
EDGE FILLETING SYSTEM

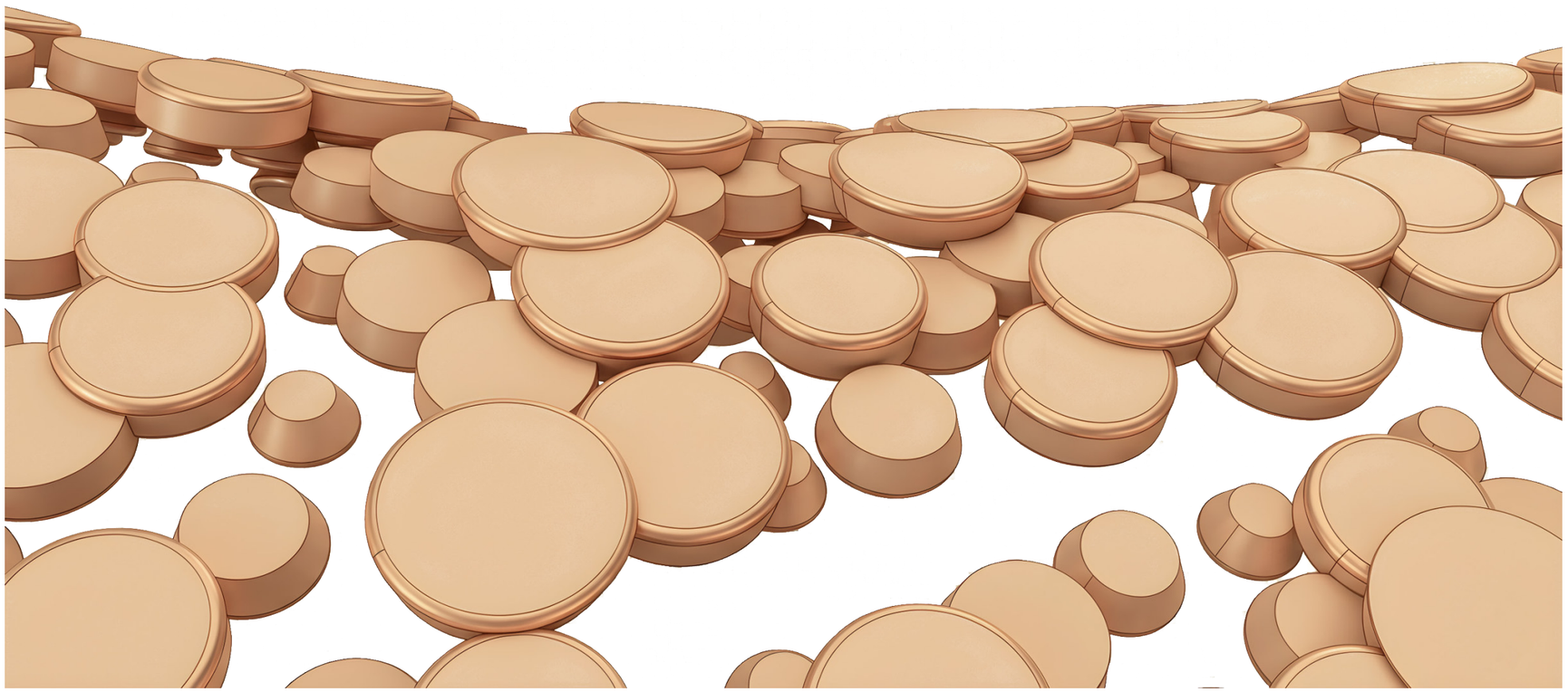
Problem

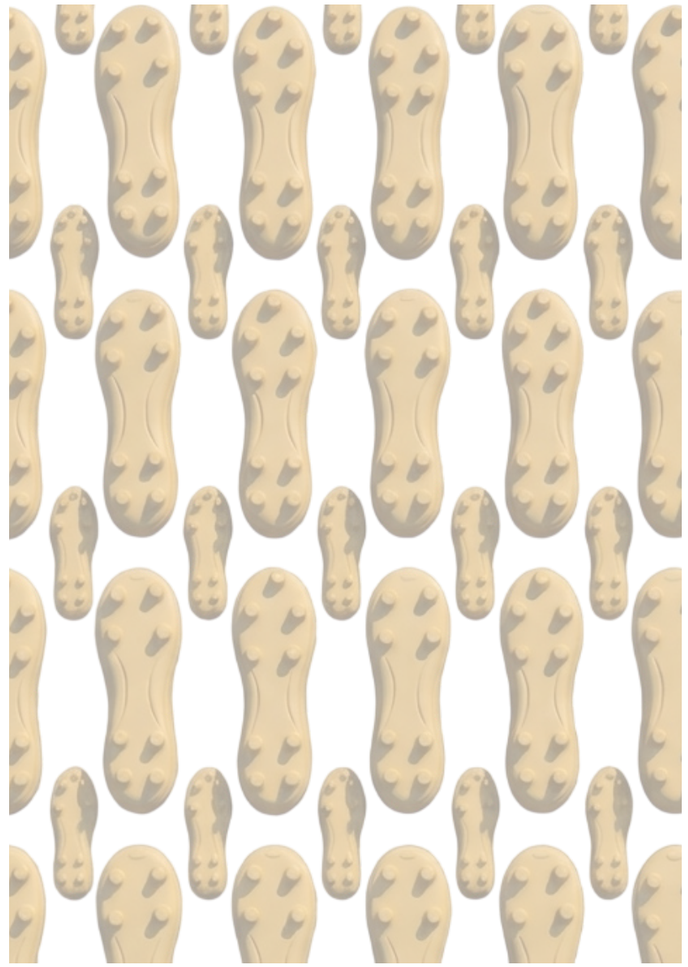
Applying fillets to complex CAD models with hundreds of edges requires manual edge identification by its indices — a process prone to selection errors and geometry failures later on if done simultaneously with standard Grasshopper components. 50+ models required 2–4 hours of manual work with ~15-20% error rate in edge selection.



Solution KPIs (35h development)

Time reduction :
2–4 hours → 3–5 minutes per 50+ models
Error elimination :
15-20% selection error rate → 0% with automated detection
Material optimization :
5–15% material reduction through consistent fillet application





Transferability

Core logic applies to any industry requiring edge treatment on complex CAD solids: automotive interior components, medical device ergonomics, consumer electronics housing, aerospace structural fairings.

Technical Implementation

Custom algorithm solves topology instability by storing edge curves before modification, then spatially relocating them after each fillet operation. Enables batch processing of complex models that break conventional filleting tools.

PROJECT LFB:
LIGHTWEIGHT FACADE BLOCK

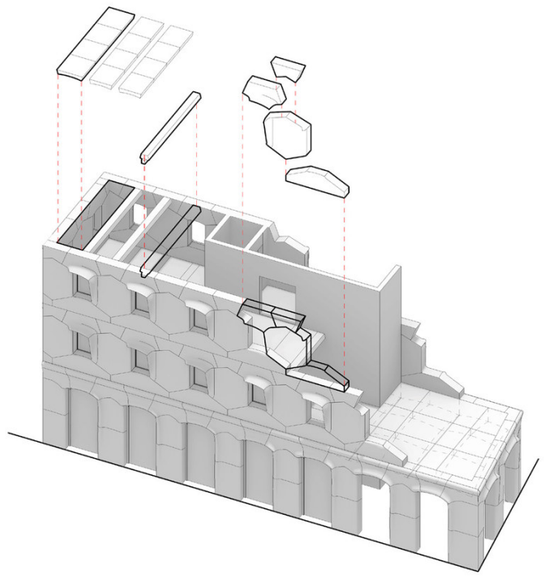
Problem

Conventional façades separate structure, insulation, shading, and cladding into distinct layers, trades, and material streams. Each added layer increases weight, labour, and waste. Integrating all functions into a sin-gle fabricable element demands a workflow where structural, thermal, and solar logic are resolved together rather than sequentially.

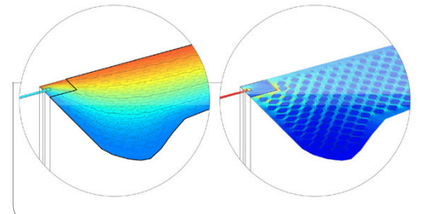
INPUT	PROCESSING	OUTPUT
façade orientation	HTflux thermal FEM/FEA across section	SPI-printable block geometry with integrated structural infill, embedded insulation channels, and orientation-specific shading
beam & window positions	SubD outer surface modelling of shading profile	
façade load paths	stress-line extraction from load cases	
target U-value	hexagonal cell sizing driven by thermal + structural results	
SPI print constraints	Ladybug sunlight & shading analysis per orientation	
	interlocking geometry generation for dry assembly	

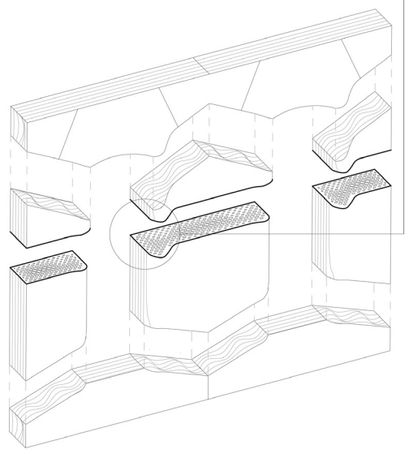
Solution KPIs (60h development)

Function integration :
structure, insulation, shading, assembly → one block
Assembly logic :
mortar-based wet trades →
dry interlocking, mortarless stacking
Design coupling :
sequential structural / thermal / solar review →
single simulation-driven geometry









Transferability

Applicable wherever structural, thermal, and shading performance must be resolved in a single fabricated element: heritage-sensitive façades, climate-adaptive enve-lopes, prefabricated dry-assembly systems, and — beyond architecture — aero-space panels and automotive components requiring functionally graded infill.

Technical Implementation

Rhinoceros 8 as the main platform, with Grasshopper coordinating Ladybug (solar), HTflux (thermal FEM/FEA), and Lunchbox (cell structure). Hexagonal infill is generated directly from simulation output rather than drawn and checked afterwards: bound concrete with re-cycled glass granulate forms the load-bearing skeleton, while unbound granulate remaining inside the printed cells acts as insulation. Cell walls thicken along stress lines traced from beam and window positions, and thin where loads are light. Shading profiles are cut into the outer surface per façade orientation. All geometry respects the 1.5 cm minimum wall thickness of the SPI process. Prototype printed by Additive Tectonics (FIT AG GmbH).

PROJECT PSA:
PARAMETRIC STAIR APPROACH

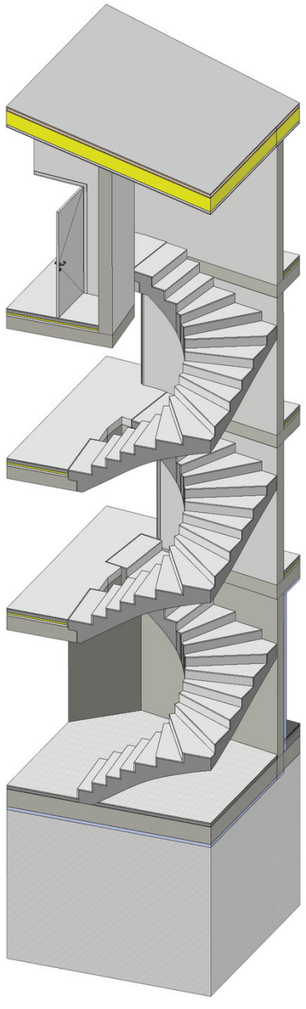
Problem

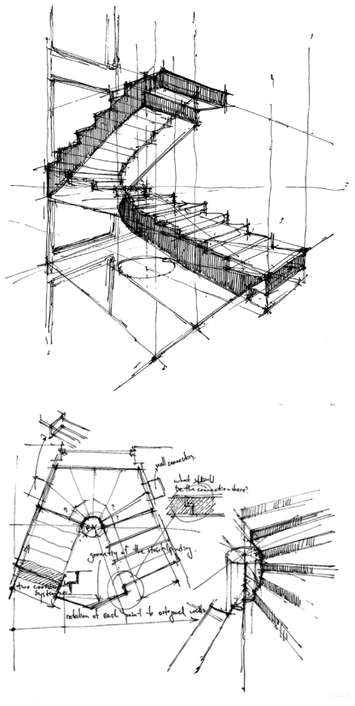
Custom staircases across 5 houses required unique geometry for 6.27° tilted walls and varying floor heights. Manual design with topology changes during sequential operations caused geometry failures requiring extensive rework for multi-scale construction documentation.

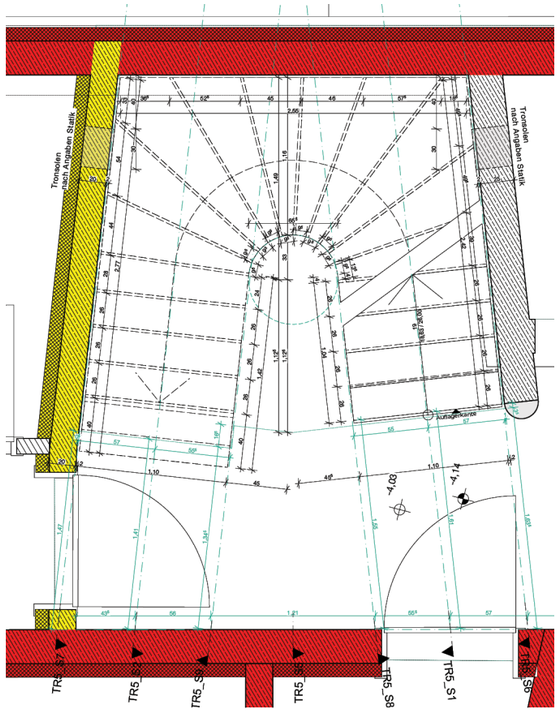
INPUT	PROCESSING	OUTPUT
stair well dimensions	parametric step calculation based on floor heights	Construction-ready stair geometry each floor of all 5 houses + automated 2D drawings (1:50, 1:20, 1:5 scales) + IFC-comp. models
floor heights per house	platform positioning with tilted wall intersection logic	
tilted wall angle (6.27°)	geometry generation maintaining topology stability	
riser/tread constraints	automated 2D generation across multiple scales	
landing positions	ArchiCAD stair tool + element editing mode integration	

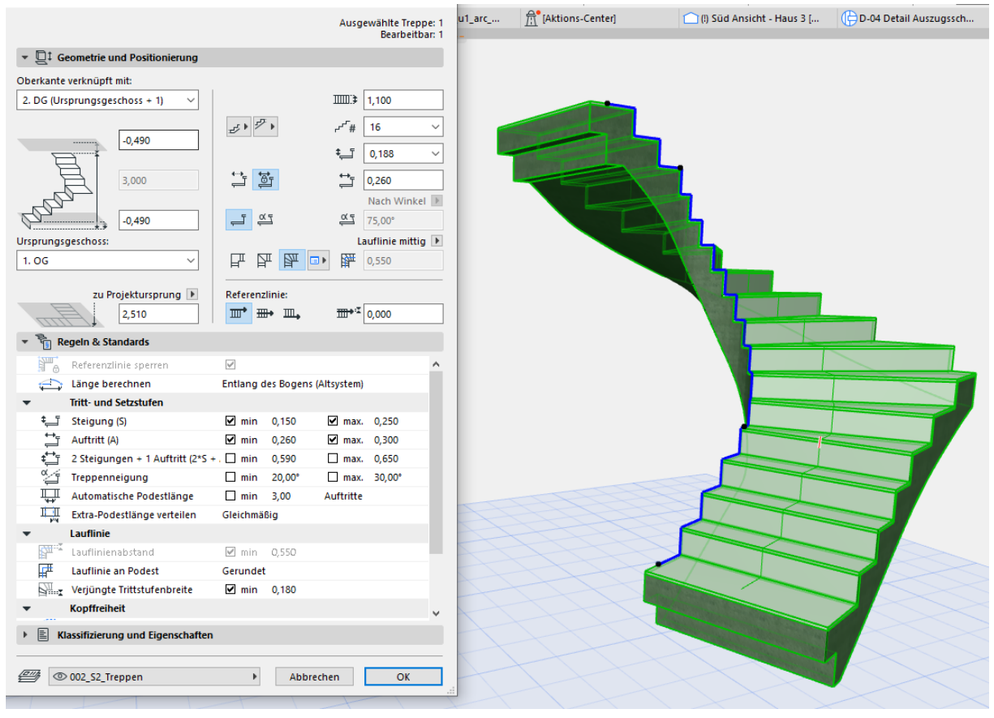
Solution KPIs (75h development)

Error elimination :
Topology-stable and construction-ready surface generation and filleting across all variants
Time reduction :
2-4 hours per stair variant → 5-10 minutes per variant
Iteration capacity :
20+ validated stair variations generated with consistent documentation









Transferability

Applicable to AEC projects requiring complex geometry with unconventional constraints (tilted walls, curved plans, split-level configurations), industrial design requiring ergonomic stair systems with variable geometries, footwear design utilizing complex curved last geometries requiring sequential surface operations and topology-stable filleting.

Technical Implementation

ArchiCAD 22 stair tool maximized through combined stair editing and whole-element editing modes. Parametric geometry maintains topology stability through sequential operations. Automated 2D generation produces 1:50, 1:20, 1:5 documentation directly from 3D model with IFC exchange for external collaboration.

PROJECT HFF: HOTLINK FLAT FRAMEWORK

Problem

169-flat development across buildings required execution documentation within 22M€ budget. Conventional single-file BIM creates unmanageable file sizes (>1GB), prevents simultaneous work, and risks corruption. Individual planning of 169 flats would exceed timeline and budget.

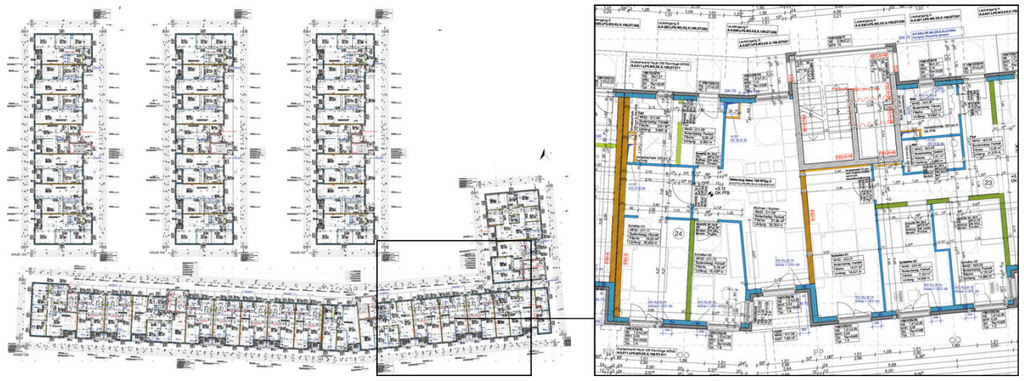
INPUT	PROCESSING	OUTPUT
169 total flats	flat module creation (12 typologies @ ~30MB each)	Coordinated BIM model across all buildings + execution-ready documents for 169 flats + local permission documentation
4 building typologies	hotlink typologies into 4 building files	
22M€ budget constraint	hotlink buildings into master file (450MB)	
regulatory requirements	simultaneous editing via Teamwork without overlap errors	
12 flat typology variations	documentation extraction from master file	

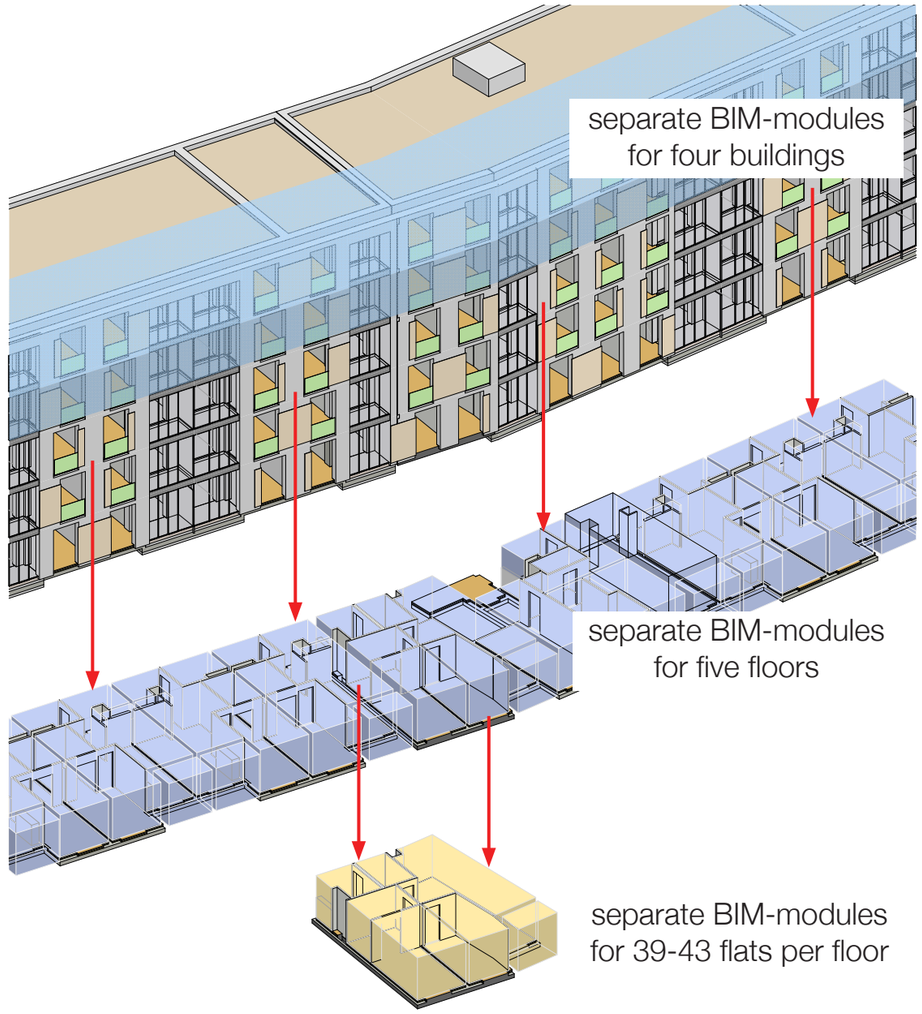
Solution KPIs (45h development)

Project duration :
2.5 years (conventional single-file workflow) →
1.5 years (modular hotlink system)
Team efficiency :
2 people working simultaneously on different modules without file conflicts
File management :
450MB master file maintained through distributed 30MB typology modules preventing misinteraction and corruption



construction site drone photo / source : client





Transferability

Applicable to large-scale residential developments with repeated unit types, mixed-use projects requiring systematic typology variation, institutional buildings (hospitals, universities, hotels) with standardized room modules, modular construction workflows requiring factory-to-site coordination, any BIM project where file size and team collaboration create bottlenecks in conventional single-file approaches.

Technical Implementation

Three-tier ArchiCAD Teamwork hotlink hierarchy: 12 flat typology modules (~30MB each) → 4 building files → 1 master file (450MB). Bottom-up change propagation enables typology edits to auto-update through buildings into master. Distributed structure prevents corruption and enables simultaneous editing without conflicts.