

ARCHITECTURAL OPTIMIZATION SOFTWARE **WINBUILDTIT**

qualifies projects in minutes.
Stops "Wild Goose" Chases! SAVES \$MILLIONS!

THE PROBLEM

Proposed commercial buildings that are never built leave a trail of wasted preliminary work that costs clients and A/E/C firms \$Millions.

Recently several Architectural firms lost over a \$Million each in a municipal competition. \$Billions more are lost to poor financial results from buildings that are built reminding us of the Empire State Building which stood largely empty for a number of years. And, with so many bidders on each project it turns out that most contractors are losers more often than not.



Fig 1, Bank America Building, Bakersfield Calif

The purpose of a commercial building is "return on investment" but returns must also be within a "client's risk tolerance" months hence. Defining these terms is impossible.

A McGraw-Hill publication lists over 200 methods for determining feasibility while "risk tolerance" has the symptoms of "gut" feeling well known as the leading cause of "cold feet" disease.

Industry practices add more uncertainty. "Requests for Proposal" ask for "bid price" while clients seek "return on investment". While this appears to properly defer to the client, the prevalence of what The Wall Street Journal calls "betting" raises questions on how well clients are actually served either by themselves or others. But regardless, the length of the process itself is like "closing the barn door after the horses escape." \$Millions are sometimes spent on individual projects when all the client wanted was a simple "yes" or "no" answer to the question "is it feasible?"

But credit must also be given where credit is due. Human shortcomings being what they are Architects and others who set direction are faced with an impossible task. To predict "return on investment" from unrelated information presents a difficulty akin to landing a man on Mars with the only compass a crystal ball!

THE SOLUTION

Other industries have long been using either **Internal Rate Of Return** ("IRR") or **Modified Internal Rate Of Return** ("MIRR")¹ as an important part of their decision making process. These methods consider the time value of money. These methods are precise and deter questioning of the method.

WINBUILDIT uses these methods but combines parametrically both the building vision (Fig 1) and the business plan (Fig 2 & 3) that the client has in mind. The "which comes first, the chicken or the egg" cost conundrum or how do you know the cost without a design was overcome by a methodology for automatic structural steel design that uses an "RSMeans[™] Square Foot Costs" based relational data base. Meaningful cost and qualification data are displayed with real-time optimization and short execution time. As a result, the cost of determining qualification becomes virtually zero.

100 - CONSTRUCTION TIME MONTHS	7	
101 - YEARS (INCLUDES CONST TIME)	4	
102 - PERCENT OF GROSS AREA (11) LEASED	90	
103 - NET LEASED AREA S.F.	48276	
104 - RENT PER S.F./MONTH \$	2	AVG. 2.615599
104.5 INFLATION PERCENT/YR TO RENT	5	
104.6 INFLATION PERCENT TO SALVAGE	100	
104.7 MONTHLY COSTS \$	10000	

Fig 2, Client's Business Plan

	% GROSS AREA	NET AREA FT2	\$/FT2 - DOWN PAYMENT	\$/SQ FT/MON - RENT/FEES	\$/SQ FT/MON MAINT. COSTS
USAGE 1	10	5364	0	2	0
USAGE 2	10	5364	0	2	0
USAGE 3	10	5364	0	2	0
USAGE 4	10	5364	0	2	0
USAGE 5	10	5364	0	2	0
USAGE 6	10	5364	0	2	0
USAGE 7	10	5364	0	2	0
USAGE 8	20	10728	0	2	0
TOTALS	90	48276	0	96552	10000

104.5 INFLATION PERCENT/YR TO RENT	5	INTERNAL RATE OF
104.6 INFLATION PERCENT TO SALVAGE	100	
104.7 OTHER BUILDING MONTHLY COSTS \$	10000	

ERROR NPV \$ = -52.2
MIRR % and RE-INVES
CAPITALIZATION RATE

Fig 3, Business Plan Space Usage Variants

The relative importance of "Business Plan" to "Bid Price" in determining qualification is always an

¹ IRR treats revenue returned from the investment as being re-invested at the same IRR rate. MIRR treats revenue returned from the investment as being paid out and re-invested at a lower commercial rate. (10% default). Generally speaking the differences are not significant to the decision process.

unknown variable. **WINBUILDIT** resolves that relation simply by insisting that the client personally dictate the business plan during input and the inevitable editing that occurs following optimization. The short execution time makes this possible without violating reasonable "attention span" limits. Active participation makes for client confidence.

THE APPLICATION

Cost Files (Fig 4) are prepared leisurely "back at the office". These files act relationally. This means that any Cost File can stretch to fit any Descriptive File. Even though best results come from near size data this accommodates the flexibility needed at a first client meeting. Base cost data may be taken from "RSMMeanstm Square Foot Costs". A temporary business plan is part of the **Cost File**.

AA - INDEPENDENT MASS/CONCRETE ELEVATOR SHAFT (S)

ORIGINAL PRICE ESTIMATE: 1 NUMBER OF LEVELS AT TIME OF ESTIMATE: 5
 LEVELS NOW: 3 PRICE MULTIPLIER: 0.6 ITEM COST = 0.6

BUILDING WEIGHT KIPS: 6703.64 # COLS: 30 AVG. LOAD / COL KIPS: 223.4547
 LOAD IN KIPS PER COLUMN ASSUMED IN CONJUNCTION WITH RSMMeans TOTAL COST OF EACH SPREAD FOOTING: 150 RSMMeans TOTAL COST EACH SPREAD FOOTING: 960

A SUBSTRUCTURE	UNIT COST	TOTAL QUANTITY	ITEM COST
A1010 SPREAD FOOTINGS	1430.11	30	42903.3
A 1030 SLAB ON GRADE - S.F. SLAB	8.71	17400	151554
A 2010 BASEMENT EXCAVATION - S.F. GND	0	17400	
A 2020 BASEMENT WALL - L.F. WALLS	0	532	0

B SHELL

B SHELL	UNIT COST	TOTAL QUANTITY	ITEM COST
B 10 SUPERSTRUCTURE - \$/LB LBS. STEEL STRUCTURE	3	868187.8	2604564
B 1010 FLOOR CONSTRUCTION, ELEVATED FLOORS, S.F.	4.6	34799.99	160080
B 1020 ROOF CONSTRUCTION - S.F. ROOF	4.6	17400	80040

B20 EXTERIOR ENCLOSURE. S.F. = 22166.31

B20 EXTERIOR ENCLOSURE. S.F. =	Percent	UNIT COST	TOTAL QUANTITY	ITEM COST
B2010 - EXTERIOR WALLS - SF	0	30	0	0
B 2010 EXTERIOR WALLS S.F.	33	25	7314.883	182872.1
B 2010 EXTERIOR WALLS - SF	0	0	0	0

Fig 4, Cost Form (One of Six)

Descriptive Files are prepared in company with the client. The place might be a coffee shop. Forms (Fig 5) enable easy entry of data using plain English jargon. This includes building shape, live and dead loads, set backs, lateral force options, shape data bases, wind and seismic loads. Optional forms provide for floor and roof joists, concentrated loads, elevator shafts and enlarged interior spaces or curved external walls. Details like toilets etc. are included by reference to those in the Cost Files.

Form6 - SHAPE - A feasibility, estimating and planning tool for the Building Industry!

CLOSE FILE EDIT COMPUTE FORWARD - 104 C:\WINBUILDIT\DESC_AAA_ENGEL.txt

GROUND FLOOR BAY DIMENSIONS - LEFT TO RIGHT X DIRECTION and REAR TO FRONT Y DIRECTION

NUMBER OF BAYS LEFT TO RIGHT (X) 5 LIST2 LIST3
 NUMBER OF BAYS REAR TO FRONT (Y) 4 1 A 01
 2 B 02
 3 C 03
 4 D 04
 5 A 01

1 BAY X 30 ft in
 1 BAY Y 29 ft in

CLEAR BEFORE EDITING NUMBER OF BAYS or LEVELS - 2 TOTAL FT. 150
 REPEAT X BAYS TO RIGHT - 6 116
 REPEAT Y BAYS TO FRONT - 7

APPLY - 3
 TEXT - 5

FLOOR LEVELS - Z DIRECTION

NUMBER OF LEVELS (Z) 3 LEVEL 1
 1 GROUND LEVEL
 FLOOR TO FLOOR 13.166 ft 0 in REPEAT TO TOP - 9
 TOTAL HEIGHT FT. = 41.666

FLOOR, ROOF, WALL LOADS

APPLY - 4 NUMBER OF LEVELS 3 CLEAR WEIGHTS - 1
 50 ? FLOOR DEAD LOAD 50 psf REPEAT TO TOP - 8
 50 ? FLOOR LIVE LOAD 50 psf REPEAT TO TOP - 10
 25 ? EXTERIOR WALL WEIGHT 25 psf REPEAT TO TOP - 11
 20 ? ROOF LOAD 20 psf

PERCENTAGE DISTRIBUTION OF FLOOR AND ROOF DEAD AND LIVE LOADS TO FLOOR AND ROOF BEAMS. 50 PERCENT IS DEFAULT TO EACH..

X BEAMS 25
 Y BEAMS 75

NET AREA FOR WIND FORCE COMPUTATION. DEFAULT 100 PERCENT. WIND ACTING IN DIRECTIONS:
 LEFT/RIGHT 100
 FRONT/REAR 100

DOUBLE CLICK MOUSE TO ASSIST VALUE RETENTION. BE SURE TO CLICK SEVERAL FLOOR LEVELS TO CHECK VALUE RETENTION. APPLICATION OF A FLOOR LOAD AUTOMATICALLY SHORTENS UNBRACED LENGTH OF BEAMS TO 1 FOOT FROM APPLICABLE BAY DIMENSION. A ROOF LOAD DOES THE SAME FOR ROOF BEAMS. EXTERIOR WALL WEIGHTS HAVE NO SIMILAR IMPACT. IN CASE OF TRUSS TYPE JOISTS ADD WEIGHTS OF SAME TO FLOOR AND ROOF DEAD LOADS ON PSF BASIS.

DEVELOPER C:\WINBUILDIT\DESC_AA

Fig 5, Forms enable easy data entry.

Sketches (Fig 6) may help but formal drawings should be avoided as they tend to lock in pre-conceived notions that inhibit optimization.

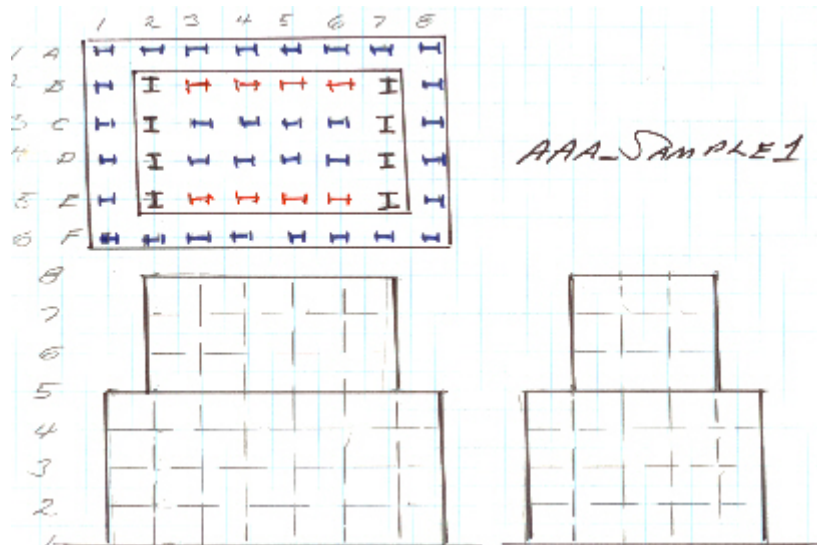


Fig 6, Table Top Sketch

With both appropriate **Description** and **Cost Files** "open" the Program user simply clicks Compute.

Within seconds a structural design is executed (Fig 7) and the monitor displays an indication of: building structural feasibility, structural weight, estimated total cost, monthly revenue, internal rate of return ("IRR"), modified internal rate of return ("MIRR"), capitalization rate and other data (Fig 8) .

Quantity	Description	Material	Dimensions
1	COL 1 5 B	N	W24X68 W16X31 W24X62
1	COL 1 6 B	Y	W36X194 W40X593
1	COL 1 1 C	Y	W36X194 W16X31 W30X90
1	COL 1 2 C	N	W24X68 W16X31 W24X62
1	COL 1 3 C	N	W24X68 W18X35 W24X68
1	COL 1 4 C	N	W24X68 W16X31 W24X62
1	COL 1 5 C	N	W24X68 W16X31 W24X62
1	COL 1 6 C	Y	W36X194 W30X90

Fig 7, Structural Shapes Computed and Displayed.

SEISMIC FACTOR = 0.1714971 GROUND WIND PSF = 23.8802 TOP LEVEL PSF = 32.21 C:\AA\BEAM\A	
TIME = 2 - SECS. (CLICK RESET FIRST IF YOU WISH TO RECOMPUTE)	
BUILDING STRUCTURE	FEASIBLE
BUILDING REPLACEMENT COST	\$9,131,450.00
MONTHLY REVENUE	\$93,590.88
INTERNAL RATE OF RETURN	33.1 % RESULT
MODIFIED IRR	31.2 % RESULT
STRUCTURE PERIOD	0.57 secs.
FABRICATED STEEL WEIGHT	857 kips
BUILDING DESIGN WEIGHT	6630 kips
GROSS FLOOR AREA	52199.99 Sq Ft

Fig 8, Financial Data Display.

The client can then direct a modeling of a range of "business plan" parameters (Fig 2 & 3) considered at risk. In this way subjective "gut feelings of risk" are re-defined by the client in terms of impact on IRR and MIRR ranges.

Ask The Client!

"Considering risks do these data qualify your project?"

Client/investors will know what the qualification is by comparing IRR and MIRR interest rate risk ranges to returns from common stocks, bonds, or other investments! The user with access to similar knowledge can predict what the qualification should be as well as sense what optimization direction should be taken in order to move the process into closer alignment with what the client has in mind.

The optimization itself is worked through an editing of the Description File (Fig 6), opening a different Description File or combining with a different or modified Cost File (Fig 2, 3 & 4). Each display of output data may suggest a new set of input data or editing to better meet client objectives. The time lapse between iterations is measured in seconds. This enables a real-time monitoring of the client's reaction and a real-time process of seeking the client's objective.

Again Ask The Client!

"Considering risks do these data qualify your project?"

By reducing the qualification process to one dealing more with objective rather than subjective qualities response possibilities become narrowed more to a simple "yes", "no" or "wavering".

Consider these as possibilities for design/builders and others marketing buildings.

- If the answer is "no" or "wavering" and **WINBUILDIT** analysis favors "no", and all efforts at optimizing have been taken, then accept "no" as final and get onto other business.
- If the answer is "no" or "wavering", and **WINBUILDIT** favors "yes", you have the option of asking why, in light of the data. Clarifying the data may salvage the proposal. If the answer remains "no" consider yourself lucky and get onto other business.
- If the answer is "yes" you should know what to do (or you shouldn't be in business).
- If the answer is "yes" and **WINBUILDIT** favors "no" you should advise the client of your view and protect your firm financially.
- If the answer is "we need to study this more" or "let me talk to my partners" then protect your firm financially.

But regardless of outcome your credibility will benefit.

THE ADVANTAGES

Qualification

Resolving qualification on day one serves to separate "live" from "dead" prospects at minimum expenditure of time and money and works to increase business volume.

Optimization

Real-time optimization combined with dual file systems quickly point to a combination of features maximizing client benefits and securing of qualification.

Marketing

In good times or bad emphasis on "client benefits" rather than "fee negotiation" is infinitely more inviting to potential clients. WINBUILDIT helps identify opportunities, create "door openers" and gives "knocking on doors" a positive purpose of presenting target clients with a specific "benefit" that will grab attention by its own merit while conveying the impression that your firm puts the client first.

Control

Use of WINBUILDIT within finalization assists in maintaining the same qualification basis.

WINBUILDIT is designed and programmed by:

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