

# BIMFORUM

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## Does the Perfect Deliverable Deliver Perfect Success?

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#BIMForumED

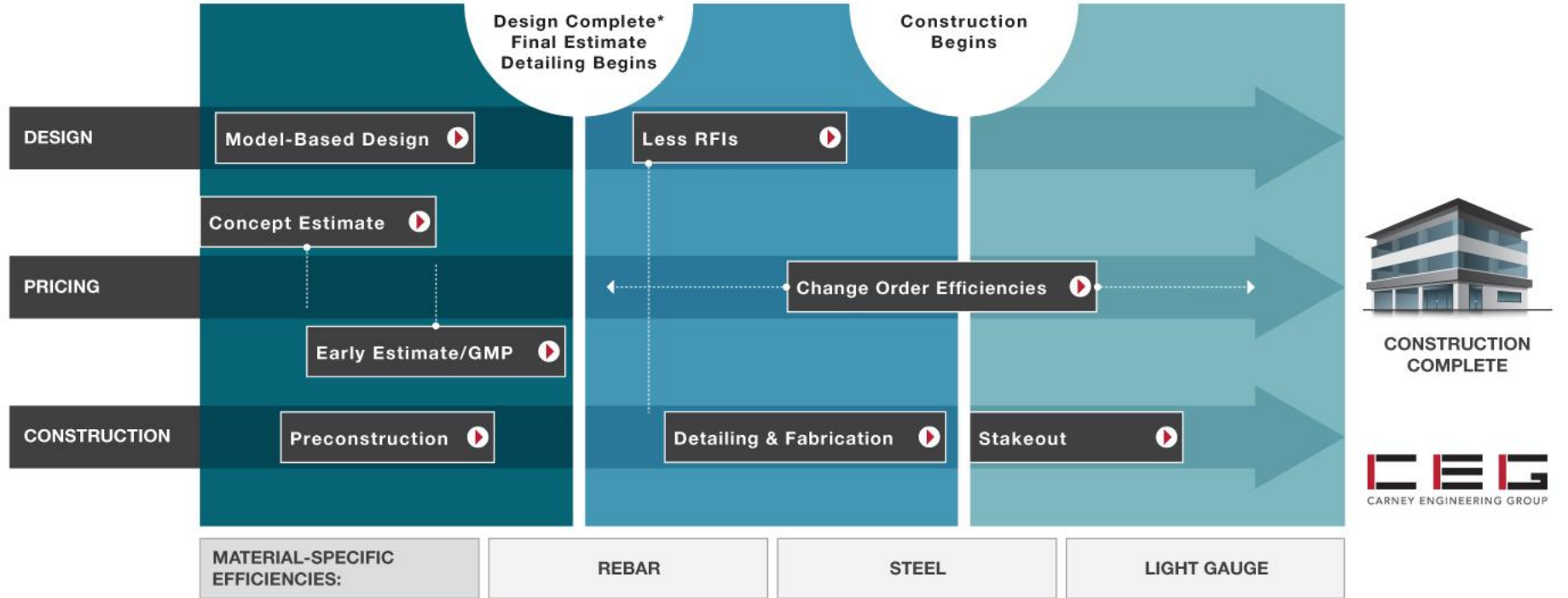
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## Why Has CEG pursued a Model-Based delivery approach?

- Opportunity for structural engineer to provide significant value to construction team
- We can significantly improve the effectiveness of our communication with the construction team
- Maximize what we could deliver for same fee or preferably deliver game changing data and charge more for it.





# MODEL-BASED DESIGN DELIVERY



## Efficiencies & Opportunities

- Real time visual coordination
- Better understanding of other trades
- Improved communication

## Pitfalls & Barriers

- Requires experienced design team
- Everyone must be on board
- High trust level
- Commitment to accuracy  
“no cheating”



# CONCEPT ESTIMATE



## Efficiencies & Opportunities

- Live estimating within the model
- Monitor impact of changes
- Reduced takeoff time

## Pitfalls & Barriers

- Need to understand what is NOT there (and when it will be)
- Need deep understanding of design process and TRUST!



# EARLY ESTIMATE/GMP



## Efficiencies & Opportunities

- Connected model at this stage
- Concrete/rebar complete
- Establishes accurate baseline price
- Provides way to specifically track changes to final design

## Pitfalls & Barriers

- Estimating carries contingency so subs do not need to
- Estimating and design need to talk so contingency accurately reflects design status



# PRECONSTRUCTION



## Efficiencies & Opportunities

- Model can improve preconstruction for owners and estimators
- Assist in logistics
- Visualization

## Pitfalls & Barriers

- Need to understand the difference between nice graphics and reality
- Changes are fluid at this stage



# LESS RFIs



*Applies to all three tracks for different reasons*





# LESS RFIs: DESIGN



## Efficiencies & Opportunities

- Better visualization
- Better 3D coordination

## Pitfalls & Barriers

- Designers are not constructors. Need to be willing to rely on construction team to fill in blind spots



# LESS RFIs: PRICING



## Efficiencies & Opportunities

- More visual observation of scope and mobile-based takeoff
- Less grunt work, time for higher level thinking

## Pitfalls & Barriers

- Estimators need to retrain their thinking – just because it is in model does not mean it is done. Same for reverse.



# LESS RFIs: CONSTRUCTION



## Efficiencies & Opportunities

- More intuitive process
- Can see conflicts
- Can submit questions with model



# CHANGE ORDER PROCESS



## Efficiencies & Opportunities

- Model is basis for price
- Additions or deductions based on model changes only

## Pitfalls & Barriers

- Add/Deduct Process
- Trust/Comfort with Model



# DETAILING & FABRICATION



## Efficiencies & Opportunities

- Detailer has less guesswork
- Accelerated detailing by pulling connection design forward
- Lets detailer focus on getting last-minute changes incorporated

## Pitfalls & Barriers

- Requires very different staffing profile in design firms
- Requires detailed understanding of fab/erect economics
- Requires construction understanding (*i.e. critical path, materials interaction, constructability*)



# STAKEOUT



## Efficiencies & Opportunities

- Stakeout personnel can “see” what final goal is
- Data download from model

## Pitfalls & Barriers

- MUST have common point during *HD Scan > Model > Stakeout*
- Requires early establishment of control
- Need critical dimensions or control to check during erection



# CONSTRUCTION



## Efficiencies & Opportunities

- Should go smoother if everything else goes correctly
- Tablets in field and in shop

## Pitfalls & Barriers

- Humans are Building
- QC/Verification still matters



# REBAR

## Efficiencies & Opportunities

- Eliminate shop drawing
- Bid from model
- Major cost efficiency, very limited additional cost up front
- Savings may cancel, but less conflict and faster into the ground
- On larger jobs – savings outweighs costs

## Pitfalls & Barriers

- Rebar fab should be model capable





# STEEL



## Efficiencies & Opportunities

- Does not eliminate shop drawing, but will allow detailer to start from a coordinated model
- No separate connection design
- Model is done to a bolt-bolt neutral type of fabrication
- Detailer finishes model – sends back as a model for review
- Drawings printed only for record and fab shop/field use



# STEEL



## Pitfalls & Barriers

- Detailer will have to adjust if fabricator wants to tweak
- Requires COMMUNICATION – favors a high skill level at detail shop
- Model ownership changes, need a



# LIGHT GAUGE



## Efficiencies & Opportunities

- ??
- ??
- This is our next step

## Pitfalls & Barriers

- TBD!





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