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ATLANTA, GEORGIA

Benefits & Pitfalls of 3D Coordination with Design-Assist
An Expert Panel Discussion
Our Panel

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  Principal of Virtual Design & Construction

David Francis – Murray Company
  MEP Manager

Brian Filkins – The Beck Group
  Collaboration Process Manager

Scott Green – Tarlton Corporation
  Manager of Construction Technology
What is Design-Assist?

Design-Assist is a project management strategy where select members of the construction team are engaged by the project owner to collaborate with the design team in advance of completion of a finished design and preparation of the associated construction documents.
Common Examples

- Exterior Enclosure Design/Fabrication
- Specialty Masonry
- Custom Casework
- Historic Restoration / Replication
- High Performance Building Systems
- Specialty Structural Steel
- Specialty Architectural Precast
Design-Assist is NOT…

It is NOT an alternative delivery system

    Delivery is still by the design team,
    but with construction trade and specialty fabricator insight.

It is NOT Integrated Project Delivery (IPD) in its pure form

    Although it contains elements of IPD,
    contractual relationships remain in their traditional form.

It is NOT Design - Build

    The contractor and architects maintain their traditional roles
    as well as their individual contractual relationships with the owner.
BIM Execution Plan Process Map

1. BD PACKAGE 1: Released 1/1/13
   - 100% DD
   - 100% Scope
   - Approximate Design

2. BD PACKAGE 2: Released 3/1/13
   - 90% CD
   - 90% Scope
   - Special Design
   - Final Set

3. BD PACKAGE 3: Released 9/1/13
   - Trade Contractor Selection Period
   - Final Design Coordination Set

4. BD PACKAGE 4: Released 10/1/13
   - Final Design Coordination Set
   - Final Design Coordination Set

5. BD PACKAGE 5: Released 11/1/13
   - Final Design Coordination Set
   - Final Design Coordination Set

6. BD PACKAGE 6: Released 12/1/13
   - Final Design Coordination Set
   - Final Design Coordination Set

7. BD PACKAGE 7: Released 1/1/14
   - Final Design Coordination Set
   - Final Design Coordination Set

8. BD PACKAGE 8: Released 2/1/14
   - Final Design Coordination Set
   - Final Design Coordination Set

9. BD PACKAGE 9: Released 3/1/14
   - Final Design Coordination Set
   - Final Design Coordination Set

10. BD PACKAGE 10: Released 4/1/14
    - Final Design Coordination Set
    - Final Design Coordination Set

11. BD PACKAGE 11: Released 5/1/14
    - Final Design Coordination Set
    - Final Design Coordination Set

12. BD PACKAGE 12: Released 6/1/14
    - Final Design Coordination Set
    - Final Design Coordination Set

13. BD PACKAGE 13: Released 7/1/14
    - Final Design Coordination Set
    - Final Design Coordination Set

14. BD PACKAGE 14: Released 8/1/14
    - Final Design Coordination Set
    - Final Design Coordination Set

15. BD PACKAGE 15: Released 9/1/14
    - Final Design Coordination Set
    - Final Design Coordination Set

16. BD PACKAGE 16: Released 10/1/14
    - Final Design Coordination Set
    - Final Design Coordination Set

17. BD PACKAGE 17: Released 11/1/14
    - Final Design Coordination Set
    - Final Design Coordination Set

18. BD PACKAGE 18: Released 12/1/14
    - Final Design Coordination Set
    - Final Design Coordination Set

19. BD PACKAGE 19: Released 1/1/15
    - Final Design Coordination Set
    - Final Design Coordination Set

20. BD PACKAGE 20: Released 2/1/15
    - Final Design Coordination Set
    - Final Design Coordination Set

21. BD PACKAGE 21: Released 3/1/15
    - Final Design Coordination Set
    - Final Design Coordination Set

22. BD PACKAGE 22: Released 4/1/15
    - Final Design Coordination Set
    - Final Design Coordination Set

23. BD PACKAGE 23: Released 5/1/15
    - Final Design Coordination Set
    - Final Design Coordination Set

24. BD PACKAGE 24: Released 6/1/15
    - Final Design Coordination Set
    - Final Design Coordination Set

25. BD PACKAGE 25: Released 7/1/15
    - Final Design Coordination Set
    - Final Design Coordination Set

26. BD PACKAGE 26: Released 8/1/15
    - Final Design Coordination Set
    - Final Design Coordination Set

27. BD PACKAGE 27: Released 9/1/15
    - Final Design Coordination Set
    - Final Design Coordination Set

28. BD PACKAGE 28: Released 10/1/15
    - Final Design Coordination Set
    - Final Design Coordination Set

29. BD PACKAGE 29: Released 11/1/15
    - Final Design Coordination Set
    - Final Design Coordination Set

30. BD PACKAGE 30: Released 12/1/15
    - Final Design Coordination Set
    - Final Design Coordination Set
### Contingency Split

<table>
<thead>
<tr>
<th>Contingency Depletion from Approved Items in Article 2.3.2.12</th>
<th>Examples:</th>
<th>$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$0.0</td>
<td>Unavailability of Materials; Acceleration Cost Escalations; Corrective of Work Claim Settlements; Legal Fees</td>
<td>$0.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>25% of Remainder</th>
<th>CMc</th>
<th>$750,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>33.00% Exterior</td>
<td>$247,500</td>
<td>$0</td>
</tr>
<tr>
<td>21.00% Interior</td>
<td>$157,500</td>
<td>$0</td>
</tr>
<tr>
<td>18.00% HVAC</td>
<td>$135,000</td>
<td>$0</td>
</tr>
<tr>
<td>9.00% Plumbing</td>
<td>$67,500</td>
<td>$0</td>
</tr>
<tr>
<td>3.00% Fire Protect</td>
<td>$22,500</td>
<td>$0</td>
</tr>
<tr>
<td>16.00% Electrical</td>
<td>$120,000</td>
<td>$0</td>
</tr>
<tr>
<td>50% of Remainder</td>
<td>Owner</td>
<td>$1,500,000</td>
</tr>
</tbody>
</table>

**Total**

$3,000,000
Expectation of design coordination with schedule & deliverables

- Design Coordination schedule vs LOD
- Conceptual Modeling

1.1.1 LODs and Design Phase
The LODs are not defined by design phases. Rather, design phase completion, as well as any other milestone or deliverable, can be defined through the LOD language. There are several important reasons for this approach:

1) There is currently no detailed standard for the design phases. Many architects have created in-house standards, but these differ from one firm to the next, and even within a single firm the requirements are sometimes adjusted to the needs of a particular project.

2) Building systems progress from concept to precise definition at different rates, so at any given time different elements will be at different points along this progression. At completion of the Schematic Design phase, for example, the model will include many elements at LOD 200, but will also include many at LOD 100, as well as some at LOD 300, and possibly even LOD 400.

1.1.2 LODs and Model Definition
There is no such thing as an "LOD # model." As previously stated, project models at any stage of delivery will invariably contain elements and assemblies at various levels of development. As an example, it is not logical to require an "LOD 200 model" at the completion of the schematic design phase. Instead, the "100% SD Model" will contain modeled elements at various levels of development.
LOD and modeling accuracy on a moving target

- Reactionary Design Coordination
- Design team at different LOD
Staged coordination based on development of design model elements

- Clash Avoidance
- Staged or Phased Coordination

<table>
<thead>
<tr>
<th>STAGE 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building Structure</td>
</tr>
<tr>
<td>Main MEPF Risers (If the content is shown on a riser diagram then it is modeled)</td>
</tr>
<tr>
<td>Underground MEPF content (including storage tanks, pumps, wells, etc.)</td>
</tr>
<tr>
<td>MEPF Equipment and Pads</td>
</tr>
<tr>
<td>Framing at Shaft Walls, Electrical Rooms, and Walls Required to Accommodate Core Systems and Risers</td>
</tr>
<tr>
<td>Pneumatic Tube Risers/Stations</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STAGE 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Framing for Top Track, Jambs, Headers, and Corner Studs</td>
</tr>
<tr>
<td>Gravity Systems</td>
</tr>
<tr>
<td>Mechanical or Plumbing Racks (10lbs per linear ft. or greater)</td>
</tr>
<tr>
<td>Mechanical Main Duct</td>
</tr>
<tr>
<td>Pneumatic Tube Horizontal Distribution/Diversers/Blowers</td>
</tr>
<tr>
<td>Recessed Light Fixtures and Supports</td>
</tr>
<tr>
<td>Owner Dictated Access Requirements</td>
</tr>
<tr>
<td>Overhead Miscellaneous Steel Supports</td>
</tr>
<tr>
<td>Fire Mains</td>
</tr>
<tr>
<td>Plumbing Pressure and Mechanical Wet 4&quot; or greater</td>
</tr>
<tr>
<td>Cable Tray/Hooks</td>
</tr>
<tr>
<td>Electrical Racks for Power and Low Voltage</td>
</tr>
<tr>
<td>Ceilings, Joists, and Supports</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STAGE 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duct Branchlines and Appurtenances</td>
</tr>
<tr>
<td>Remaining Balance of Mechanical Wet</td>
</tr>
<tr>
<td>Remaining Balance of Plumbing Pressure System</td>
</tr>
<tr>
<td>Fire Branchlines and Drops (may need to be accelerated for document creation)</td>
</tr>
<tr>
<td>Framing Backing</td>
</tr>
<tr>
<td>Electrical Ceiling Devices (may need to be accelerated for document creation)</td>
</tr>
<tr>
<td>Electrical In-Wall Devices (may need to be accelerated for document creation)</td>
</tr>
<tr>
<td>Zone Valve Boxes</td>
</tr>
<tr>
<td>Casework</td>
</tr>
<tr>
<td>HVAC Controls</td>
</tr>
<tr>
<td>Misc. Recessed Fixture for Division 10 Items</td>
</tr>
</tbody>
</table>
Brian’s thoughts…

- Team collaboration and accountability/buy-in
- What are the benefits to the Owner?
- How do they know they’re getting a fair deal?
- Separate BIM Execution Plans
- 3D Coordination:
  - Pulling forward
  - System prioritization
Design-Assist Partners

• When to engage a Design Assist Partner
  • Clearly define the expectations
  • Clearly define the starting point

• Who is the Engineer of Record?
  • Design Engineer
    • How to avoid dual models?
  • Design Assist Partner
    • Role of the Design Engineer?