Autodesk University Round Table Summary

SESSION TITLE	A Discussion About Overcoming the Challenges Involved in Multi-Firm BIM and IPD Projects
SESSION ID	CM1482-R
SPEAKER	Brett Gatti
COMPANY	Harley Ellis Devereaux

MAIN DISCUSSION POINTS

- Determine the best methods for sharing data (WAN, FTP data transfer, exports, and so on) throughout the project team – regardless of geographic location
- Acquire the proper information to develop best practices for BIM and IPD collaboration among multiple disciplines and multiple firms
- Assemble lessons learned for working in a multi-firm, BIM and IPD process based upon real-world feedback from others
- Get real-world tips from others about working with team members who are not using the same software as the rest of the team

KEY TAKE-AWAYS

- Co-Location seems to be the most effective method for bringing project teams together
- Data consistency (naming and content) is always a problem when working with others
- Linked AutoCAD data is here to stay - in most Revit projects. How we work with it is key
- Compiled and shared Lesson's Learned can help to avoid repeating past mistakes/issues

SUGGESTED FOLLOW-UP

- Please see the session Q & A recap on the following pages:

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The information below is based upon the round table discussion "*A Discussion About Overcoming the Challenges Involved in Multi-Firm BIM and IPD Projects*" (Session ID **CM1482-R**).

I have attempted to capture the main discussion points by utilizing the recording that I made during these sessions and the notes that were taken by our volunteer "scribe". Special thanks to Christine Pimpao from Hatch Mott MacDonald for being the session "scribe".

Note: I also included what I feel are some relevant comments (marked with **) that came up during additional conversations that I was part of at Autodesk University (outside of our Roundtable Discussion).

Don't hesitate to contact me if you'd like to add something to this document or for any other reason.

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Round Table Recap – Discussion Topics with commentary

Topic: **How?**
Sharing data on BIM / IPD Projects

1. What types of IPD projects have you worked on and can you attribute any specific advantages or disadvantages to any of these methods? Various examples were cited.
    a. Full IPD - IPD with "co-located" team members
        i. Firms who have worked on projects that have included co-located team members all stated that the interaction/relationship was successful. Working on the same network and working directly in the same model(s) was determined to be mutually beneficial
    b. IPD with direct network connection (project team accesses one data set hosted by another team member)
        i. Some firms allow others to access data directly on their network via WAN connectivity. Some potential challenges were identified:
            1. Connection can be slow/"wobbly"
            2. Security concerns – allowing others onto "your" network.
            3. Slow connections can cause users to not have access to project data. Ex: the Revit model will not open or links are not available.
            4. Slow connections/intermittent connections can lead to corrupt data sets/corrupt Revit models (data in Temp/Backup folders can become corrupt).
            5. Latency is key to this type of model sharing/connectivity.
            6. Pathing. Drive letters must be used with this type of sharing (UNC will typically not be available). Everyone must have the EXACT same mappings.
        ii. When working on a project across a single company with multiple offices, Remote Desktop and/or Virtual Desktops can be used.
        iii. **Remote Desktop/Virtual Machines "would" be a viable option for direct network connection but Autodesk's standard Licensing Agreement does not allow others to "borrow" your licenses – regardless of how many licenses each organization holds.
        iv. **This method can be successful, but team members have to plan for potential slowdowns and possible periods of "no connectivity".
            1. Synchronize with Centrals must be coordinated.

     c. IPD with an aggressive posting schedule
- i. The more often you post, the more potential "clean-up" work you may have to do on the other firms model so that it is usable by you.
- ii. The larger the file, the more clean-up work may be involved
    1. Some firms have hired a person to "clean up" the model prior to it being posted for others. The example given mentioned starting the process on Tuesday for a Friday posting. This could lead to semi out of date information being made available for other team members.
    2. Items to be "cleaned" may include Sheets, Views, Families, etc...
- iii. **The posting/sharing schedule is sometimes driven by client requirements.
- iv. **One organization mentioned that they started with an very aggressive posting schedule (twice weekly) and found it to be too cumbersome. They ended up adjusting it back to once a week.

2. What method does your firm use to share data with project partners?
    a. Direct Connection to network data via WAN Accelerators
    b. Cloud Service/Virtualization.
        - i. Advance 2000 was mentioned as being a very good option.
    c. Newforma (many organizations already have this solution in place)
        - i. **Standard Newforma Transmittals
        - ii. **Shared folders. Can schedule automatic synchronization or perform manually.
        - iii. **Newforma to Newforma. This connection allows for the automatic synchronization of data between the Newforma Servers at two different organizations.
    d. FTP Sites
        - i. Quite often the simplest method.
        - ii. Lack of tracking/logging can make this an unattractive/undesirable option.
    e. Dropbox and other file sharing sites
    f. Project Wise
    g. **Email
        - i. Most organizations have caps on the maximum size email that is allowed.

3. With any "posting" method, files need to be broken up into manageable and logical sizes.

4. All Project Team Members working in Revit **MUST** be on the exact same version of Revit.
    a. This includes Service Packs / Web Updates

5. Potential issues with Direct Connection method that is mentioned earlier in this document.
    a. Security questions
        - i. Direct Connection always has security concerns. Who needs access to "what".
            1. Network permissions can be configured to only allow access to one specific network folder.
            2. **Can cause issues for IT if you have many shared projects with multiple firms.
    b. **Last minute user account access for "added" team members as the project proceeds
        - i. **There is always a problem when team members are added at the last minute and need access to project data on "your network".
        - ii. **Advance communication about changes to the project team is critical.

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Topic: **What?**
Working on projects when one or more team member is using "other" software

1. Most companies are still dealing with Lessons Learned - related to working with other software packages.

2. What type of "other" software packages do you typically have to deal with?
    a. In addition to Revit, the common formats that organizations are still working with are: AutoCAD (DWG), Civil 3D (DWG) and Microstation (DGN)

3. Identifying specific problems related to working with "other" software packages.
    a. AutoCAD files do not "section" properly when linked into Revit files
        i. Quite often, linking the 3D AutoCAD data into an in-place Massing Family will allow for better sectioning than a simple AutoCAD link.
    b. **Coordinate System alignment
        i. **Survey / Civil files usually have origins far outside the Revit 20 mile limit and quite often acquiring coordinates from these files can cause issues. There are a few ways to work around this issue.
            1. **Physically move the data in the survey file so that the origin matches a local site monument.
            2. **Use a local item (site monument) to establish your project origin. Identify the difference between origins in order to match the survey file.
            3. **When linking other Revit files, some firms use a common insertion point/marker (preloaded in each Revit template file) to ensure that the Revit internal origins align.
            4. **Quite often, Civil files do not show up until late in the workflow. Therefore trying to utilize that data for Shared Coordinates can be problematic.
                a. The BIM Coordinator utility from AutoDesk Labs was created to help coordination efforts when working between Civil 3D and Revit.
    c. Visibility issues
        i. 3D AutoCAD (DWG) data does not always display as expected (especially in sections) when linked into Revit – even if all recommendations are followed. A couple of potential workarounds were mentioned:
            1. 3D info can be used for coordination but 2d data is generated for documentation.
            2. 3D AutoCAD into "in place Masses"
            3. IFC format was mentioned as a possible "clean" method to get 3D CAD data into Revit. No one in the room had much experience with this method.
    d. Inconsistent or incomplete data from project partners
        i. Out of date information is an ongoing problem. Partners not posting on time, or posting "different" information each time.
        ii. Posted file names must be consistent. There is no need to add Date/Time information to a posted file name.
    e. Revit sometimes "loses" AutoCAD files.
        i. The file(s) have not moved or changed but Revit may report that it cannot be found/loaded. Remove and reattach is the only option – unless you choose to ignore the message.

      f.   **Make sure that all necessary linked discipline files are visible when modeling.

4. Export procedures
   a. Do you export on a fixed scheduled or on an as needed basis?
      i. A schedule should be established at the start of the project.
      ii. Team members must meet their scheduling commitments.
      iii. The schedule can be modified (accelerated or scaled back) as the project proceeds.
   b. Who exports your AutoCAD backgrounds?
      i. Each project team should be responsible for exporting their own CAD backgrounds or at the very least; they should create specific Export Views in their respective Revit model(s).

5. BIM / Model Coordinators
   a. Project BIM / Model coordinators were recommended by a few participants. This role is typically an overhead expense but those who utilize this position say that it is well worth it and that it is extremely important.

Topic: **Problems**
Common Pitfalls or Problems you can run into when working on a multi-firm BIM / IPD Project

1. Typical Issues that were mentioned.
   a. File names changing with each posting
   b. Background Data / Visibility changing with each posting
   c. Project BIM / Model coordinators were mentioned as a project role to help get through the "typical" issues.
   d. Some organizations still feel that working is Revit is not beneficial to them. Claim that too much effort is involved which inhibits their chance to made adequate profit.

Topic: **Step-by-Step**
Documenting the process

1. BIM Coordination Document
   a. The general consensus is that there should be an early project kickoff meeting that focusses on the BIM Coordination documents. Representatives from all parties involved with the project should be present. This document can be an addendum to or part of the Project BIM Execution Plan (BEP).
   One thing that was mentioned that should not be included in the BEP or the Contract language is the guarantee of "a clash free model". "Reduced clash" or "minimal clash" models were mentioned as a possible language substitution.
      i. **Level of Detail/Level of Development (LOD) should be one of the topics of discussion.
      ii. Most people in the session use a BIM Coordination Document of some sort. Some organizations have worked this information into their contracts and/or the BEP.
   b. **Who owns it / prepares it?
      i. Typically, whoever is leading the overall project (contract holder) or the one who is taking the lead for the coordination efforts is will be the "owner" of this document.
   c. **What should be in it?

    i.   **Software requirements – titles and versions
        1.   **Identify which Revit version is required.
               a.   Is the chosen version an owner driven requirement?
        2.   **The document should specify that NO ONE changes the Revit version unless ALL Revit disciplines agree.
               a.   **Note: Some project partners may not be able to upgrade their project files even if the rest of the team wants to. Revit does not always upgrade files "cleanly".
               b.   **Most organizations stated that they usually don't consider upgrading any Revit projects until after the first Service Pack/Web Update is released.
        3.   **What other software packages will be used (AutoCAD, CADMep, etc…)

    ii.   Which team members are using Revit?
        1.   Each Revit discipline/project partner should be identified

    iii.   **Primary BIM / IPD contacts at each organization
        1.   **In addition to the Project Management at each company, a BIM contact should be identified.
               a.   **This is the person to contact if data is late, incorrect or inconsistent.

    iv.   **Who is hosting the data and what method is being used?
        1.   Which company is hosting project data?
               a.   **Compile a list of names (and email addresses) of the people who will need logins for the chosen data transfer method.
               b.   **The hosting company should set up logins ASAP after the meeting

    v.   Posting schedule / Export schedule
        1.   Identify how often files need to be posted for coordination purposes.
               a.   Weekly, Daily, Bi-Weekly, other….

    vi.   Special requirements / needs for any team members (especially those using "other" software
        1.   Do you need to regularly post DWG, NWC, etc… formats?

    vii.   File naming convention
        1.   During the project kickoff meeting, a naming convention should be discussed. Each project partner must consistently post files that follow the agreed upon naming structure.

Topic: **Lesson's Learned**

Capturing "Lesson's Learned" on multi-firm BIM and IPD projects

1. Ask Clients/Subs/Project Partners to document Lesson's Learned after each project to share with the rest of the team.
   a. Documentation at this time will help to avoid the same pitfalls/problems on subsequent projects.

2. BIM Coordinator / Project Management should meet to discuss/document internal Lesson's Learned.
   a. There should be an initiative for creating Lesson's Learned at the end of each and every project.
      i. Responsibility for this effort can be spread between each discipline and the team BIM Coordinators.

3. A "tier down" approach can be used for communication (part of the BIM Coordinator role)
    a. Audit Models and report to team
    b. Lead Clash Meetings
    c. Review Warnings and report to team
    d. Etc…

4. Sharing Template files (Pro's and Con's)
    a. **Some organizations share their project templates with their Consultants.
        i. Leads to better project consistency.
            1. Prepopulated with Views, Sheet Examples, View Templates, Annotation Families, etc…
    b. **Allowing Consultants to use their own templates can result in them being more comfortable.
        i. They are working with a file structure that they are familiar with.
        ii. Symbology/Annotation is in line with their internal standards (but might not meet project requirements).

Topic: **Open Discussion**

Open Group Discussion at the end of the session

1. BIM Execution Plans – do they typically get "shelved" during the project lifecycle?
    a. Some participants stated that they regularly see BEP's ignored as their projects proceed. This is typically due to time constraints and resource availability.
        i. One suggestion was to make the BEP a "semi-living" document that can be updated by an agreement of the team - as needed.
        ii. The recommendations for changes can be made via email and other sources. At some point these recommendations can be discussed and rolled into the BEP – if deemed relevant.
        iii. Issues related to trying to meet the requirements of the BEP can grow to affect overall project cost

2. Companies have to understand what the BIM Management role encompasses and the value that it brings to each project.
    a. Due to the complexities of the responsibilities, it is not necessarily a role that can be filled by a Project Architect or Designer.