



# BIM and IPD Change the World

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## Learning Objectives of this Continuing Education Program



- Recognize risks that may be mitigated by IPD and risks that may be increased by IPD
- Become familiar with insurance issues unique to IPD
- Become familiar with the different types of contracts for Integrated Project Delivery (IPD)
- Learn how to manage risks of electronic transfer of documents
- Recognize risks that may be mitigated by BIM and risks that may be increased by BIM

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## Building Information Modeling



Database of building information

- Generate 2D & 3D images
- Detect component clashes
- Perform cost estimating
- Build a building virtually



Tool for performing services

Liability for services arising from BIM is covered by the PL policy

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## Integrated Project Delivery



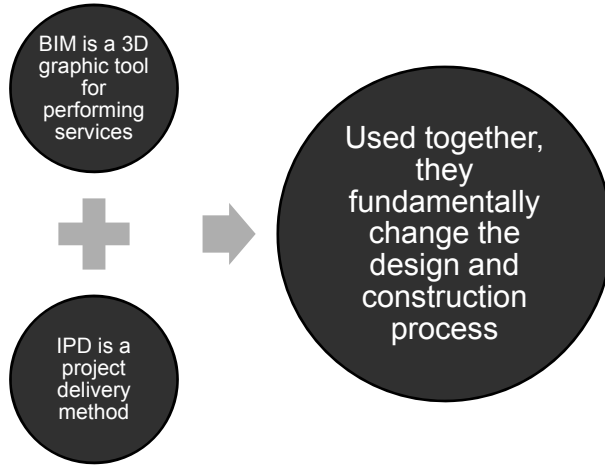
- Integrated Project Delivery (IPD) is a project delivery approach
  - that **integrates people, systems, business structures and practices** into a process that
    - **collaboratively harnesses the talents** and insights of all participants to
      - **optimize project results,**
      - **increase value to the owner,**
      - **reduce waste,**
      - **and maximize efficiency** through all phases of design, fabrication, and construction.

AIA IPD Guide (2007)

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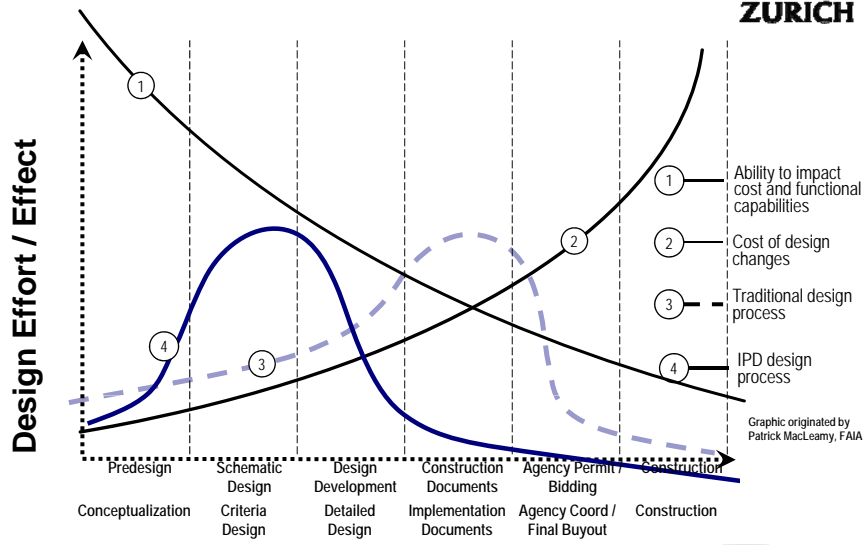
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# BIM & IPD Change the World



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# Increased Effort at Early Design



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## BIM's Big Issues



- Greater Owner Expectations
- Altered Standard of Care
- Training the team
- Legal Liability
  - Changes by Others
  - Ownership and Future Use

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## Least-Skilled Participant in BIM Creates Risk Shared by All



- Invest in training
- Be realistic about your skills/resources
- Have necessary computer hardware, software, high speed internet band-width, etc. (often established across a project)
- Utilize clash detection

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## Legal Liability



- Digital Data (CAD, BIM, reports, surveys) = intellectual property
- PL covers negligent design conveyed in Digital Data
- As the DD owner you have property rights, including copyright
- Reduce your exposure to claims by:
  - Retain property rights, and grant licenses to use
    - Control usage to authorized uses
    - Obtain release/indemnity for unauthorized use
  - Convey rights to client by contract
    - Work for hire
    - Lose control over use
    - Obtain release/indemnity for future use without your participation
    - Owner takes ownership at completion or termination
    - Control uses during design and construction

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## Changes by Others/Ownership and Future Use (1 of 2)



- Old Way: Disclaim accuracy of all data in blanket form
  - Protects your risk
  - But reduces the value of your work and creates waste
- New Way: Clarify the authorized uses—what the user may rely on
  - Obtain indemnity/release for unauthorized uses
- BIM ≠ Contract Documents
  - Allow reliance on Digital Data to the extent DD consistent with 2D Construction Set (which may be in paper format)

### Design-Bid-Build Scenario:

- BIM not fully developed—used for presentations to client
- 2D set used for bidding and construction
- Client requires turning BIM over to Contractor

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## Changes by Others/Ownership and Future Use (2 of 2)



- BIM = Construction Documents (or, contract requires data sharing)
  - You and other team members can agree to control:
    - Who can use/modify the data
    - The file format used to read the data accurately
    - Authorized uses
    - Extent of reliance on accuracy
  - Work for Hire?
    - Indemnity and release for unauthorized future use
    - Contract terms regarding usage rights during design & construction

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## In any event. . .



- Keep records of what you transmit
- Consider using a standard form:
  - AIA E201 and AIA E202
  - ConsensusDOCS 301

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# AIA E202-2008



## ● Defines 5 levels of development (LOD) for the Model(s)

### § 3.2 LOD 100

§ 3.2.1 **Model Content Requirements.** Overall building massing indicative of area, height, volume, location, and orientation may be modeled in three dimensions or represented by other data.

### § 3.2.2 Authorized Uses

§ 3.2.2.1 **Analysis.** The Model may be analyzed based on volume, area and orientation by application of generalized performance criteria assigned to the representative Model Elements.

§ 3.2.2.2 **Cost Estimating.** The Model may be used to develop a cost estimate based on current area, volume or similar conceptual estimating techniques (e.g., square feet of floor area, condominium unit, hospital bed, etc.).

§ 3.2.2.3 **Schedule.** The Model may be used for project phasing and overall duration.

§ 3.2.2.4 **Other Authorized Uses.** Additional authorized uses of the Model developed to a Level 100, if any, are as follows:

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§ 2.4.4.3 The procedures for storing and preserving the Model upon final completion of the Project are as follows:

§ 2.4.5 Other requirements for Model management, if any, are as follows:  
(Describe in detail any other Model management requirements.)

### ARTICLE 3 LEVEL OF DEVELOPMENT

§ 3.1 The following LOD descriptions identify the specific content requirements and associated authorized uses for each Model Element at five progressively detailed levels of completeness. Each subsequent LOD builds on the previous level and includes all the characteristics of previous levels. The parties shall utilize the five LODs described below in completing the Model Element Table at Section 4.3, which establishes the required LOD for each Model Element at each phase of the Project.

#### § 3.2 LOD 100

§ 3.2.1 **Model Content Requirements.** Overall building massing indicative of area, height, volume, location, and orientation may be modeled in three dimensions or represented by other data.

#### § 3.2.2 Authorized Uses

§ 3.2.2.1 **Analysis.** The Model may be analyzed based on volume, area and orientation by application of generalized performance criteria assigned to the representative Model Element.

§ 3.2.2.2 **Cost Estimating.** The Model may be used to develop a cost estimate based on current area, volume or similar conceptual estimating techniques (e.g., square feet of floor area, condominium unit, hospital bed, etc.).

§ 3.2.2.3 **Schedule.** The Model may be used for project phasing and overall duration.

§ 3.2.2.4 **Other Authorized Uses.** Additional authorized uses of the Model developed to a Level 100, if any, are as follows:

#### § 3.3 LOD 200

§ 3.3.1 **Model Content Requirements.** Model Elements are modeled as generalized systems or assemblies with approximate quantities, size, shape, location, and orientation. Non-geometric information may also be attached to Model Elements.

#### § 3.3.2 Authorized Uses

§ 3.3.2.1 **Analysis.** The Model may be analyzed for performance of selected systems by application of generalized performance criteria assigned to the representative Model Element.

§ 3.3.2.2 **Cost Estimating.** The Model may be used to develop cost estimates based on the approximate data provided and conceptual estimating techniques (e.g., volume and quantity of elements or type of system selected).

§ 3.3.2.3 **Schedule.** The Model may be used to show ordered, time-scaled appearance of major elements and systems.

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## AIA E202 Levels of Development

**LOD 100:** Massing content indicative of volume, location, and orientation.

**LOD 200:** Generalized systems or assemblies with approximate quantities.

**LOD 300:** Specific assemblies accurate in terms of quantity, size, shape, location, and orientation.

**LOD 400:** LOD 300 with fabrication, assembly and detailing information added.

**LOD 500:** "Record Model"



**§ 4.3 Model Element Table**  
 Identify (1) the LOD required for each Model Element at the end of each phase, and (2) the Model Element Author (MEA) responsible for developing the Model Element to the LOD identified.

*Insert abbreviations for each MEI identified in the table below, such as "A - Architect" or "C - Contractor."*

*NOTE: LODs must be adapted for the unique characteristics of each Project.*

**Model Element Abbreviation (MEI) Classification\*\***

	LOD 100	LOD 200	LOD 300	LOD 400	LOD 500	LOD 600	LOD 700	LOD 800	LOD 900	LOD 1000	MEI Number (See 4.1)
<b>A. SUBSTRUCTURES</b>	A100	A100	A100	A100	A100	A100	A100	A100	A100	A100	
A100 Foundations	A100	A100	A100	A100	A100	A100	A100	A100	A100	A100	
A100 Special Foundations	A100	A100	A100	A100	A100	A100	A100	A100	A100	A100	
A100 Retention Walls	A100	A100	A100	A100	A100	A100	A100	A100	A100	A100	
A100 Retention Walls	A100	A100	A100	A100	A100	A100	A100	A100	A100	A100	
<b>B. SHELL</b>	B100	B100	B100	B100	B100	B100	B100	B100	B100	B100	
B100 Superstructure	B100	B100	B100	B100	B100	B100	B100	B100	B100	B100	
B100 Roof Construction	B100	B100	B100	B100	B100	B100	B100	B100	B100	B100	
B100 Exterior Walls	B100	B100	B100	B100	B100	B100	B100	B100	B100	B100	
B100 Exterior Walls	B100	B100	B100	B100	B100	B100	B100	B100	B100	B100	
B100 Exterior Windows	B100	B100	B100	B100	B100	B100	B100	B100	B100	B100	
B100 Exterior Doors	B100	B100	B100	B100	B100	B100	B100	B100	B100	B100	
B100 Roofing	B100	B100	B100	B100	B100	B100	B100	B100	B100	B100	
B100 Roofing	B100	B100	B100	B100	B100	B100	B100	B100	B100	B100	
<b>C. INTERIORS</b>	C100	C100	C100	C100	C100	C100	C100	C100	C100	C100	
C100 Interior Construction	C100	C100	C100	C100	C100	C100	C100	C100	C100	C100	
C100 Interior Construction	C100	C100	C100	C100	C100	C100	C100	C100	C100	C100	
C100 Partitions	C100	C100	C100	C100	C100	C100	C100	C100	C100	C100	
C100 Partitions	C100	C100	C100	C100	C100	C100	C100	C100	C100	C100	
C100 Ceilings	C100	C100	C100	C100	C100	C100	C100	C100	C100	C100	
C100 Ceilings	C100	C100	C100	C100	C100	C100	C100	C100	C100	C100	
C100 Floor Finishes	C100	C100	C100	C100	C100	C100	C100	C100	C100	C100	
C100 Floor Finishes	C100	C100	C100	C100	C100	C100	C100	C100	C100	C100	
C100 Wall Finishes	C100	C100	C100	C100	C100	C100	C100	C100	C100	C100	
C100 Wall Finishes	C100	C100	C100	C100	C100	C100	C100	C100	C100	C100	
C100 Ceiling Grids	C100	C100	C100	C100	C100	C100	C100	C100	C100	C100	
C100 Ceiling Grids	C100	C100	C100	C100	C100	C100	C100	C100	C100	C100	
<b>D. SERVICES</b>	D100	D100	D100	D100	D100	D100	D100	D100	D100	D100	
D100 Core/Shell	D100	D100	D100	D100	D100	D100	D100	D100	D100	D100	
D100 Core/Shell	D100	D100	D100	D100	D100	D100	D100	D100	D100	D100	
D100 Electrical & Life	D100	D100	D100	D100	D100	D100	D100	D100	D100	D100	
D100 Electrical & Life	D100	D100	D100	D100	D100	D100	D100	D100	D100	D100	
D100 Mechanical	D100	D100	D100	D100	D100	D100	D100	D100	D100	D100	
D100 Mechanical	D100	D100	D100	D100	D100	D100	D100	D100	D100	D100	
D100 Plumbing	D100	D100	D100	D100	D100	D100	D100	D100	D100	D100	
D100 Plumbing	D100	D100	D100	D100	D100	D100	D100	D100	D100	D100	
D100 Fire Protection	D100	D100	D100	D100	D100	D100	D100	D100	D100	D100	
D100 Fire Protection	D100	D100	D100	D100	D100	D100	D100	D100	D100	D100	
D100 Energy	D100	D100	D100	D100	D100	D100	D100	D100	D100	D100	
D100 Energy	D100	D100	D100	D100	D100	D100	D100	D100	D100	D100	
D100 Distribution	D100	D100	D100	D100	D100	D100	D100	D100	D100	D100	
D100 Distribution	D100	D100	D100	D100	D100	D100	D100	D100	D100	D100	
D100 Telecommunications	D100	D100	D100	D100	D100	D100	D100	D100	D100	D100	
D100 Telecommunications	D100	D100	D100	D100	D100	D100	D100	D100	D100	D100	
D100 Security	D100	D100	D100	D100	D100	D100	D100	D100	D100	D100	
D100 Security	D100	D100	D100	D100	D100	D100	D100	D100	D100	D100	
D100 Other	D100	D100	D100	D100	D100	D100	D100	D100	D100	D100	
D100 Other	D100	D100	D100	D100	D100	D100	D100	D100	D100	D100	

**Phase**

**UniFormat 300 Series**

**Level of Development**

**Model Element Author**

**Notes**

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## E202-2008 Building Information Model Reliance – Legal liability



- **§ 4.1.3 Any use of, or reliance on, a Model Element inconsistent with the LOD indicated in Section 4.3 by subsequent Model Element Authors or Model Users**
  - shall be at their sole risk and without liability to the Model Element Author.
- To the fullest extent permitted by law, subsequent Model Element Authors and Model Users shall **indemnify and defend the Model Element Author**
  - from and against all claims arising from or related to the subsequent Model Element Author's or Model User's **modification to, or unauthorized use of,** the Model Element Author's content.

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## ConsensusDOCS 301 BIM Addendum



- Establishes legal boundaries for using BIM in traditional delivery
- Legal Principles Preserve status quo
  - 1.4 Nothing shall relieve the A/E from its obligation as the person responsible for and in charge of the design of the Project
  - 1.5 Nothing shall diminish the extent to which the Owner warrants to any Party the adequacy and/or sufficiency of the design
  - 1.6 Contractors' contributions to Model shall not constitute performance of design services

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## ConsensusDOCS 301 BIM Addendum



- Definitions for 6 types of models:
  - Construction Model
  - Design Model = level of development of 2D CDs
  - Federated Model
  - Full Design Model = includes coordinated S, MEP
  - Model
  - Project Model
- Design Model can be relied on and takes priority in conflict

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## ConsensusDOCS 301 BIM Addendum



- Directs parties to agree upon a BIM Execution Plan (BIM Execution Plan is not included in this document)
  
- Lists 29 Requirements for BIM Execution Plan
  - Identify Models to be created and purposes of
  - Identify which Models are NOT Contract Documents
  - Portions of Project to be modeled
  - Content of each Model and level of detail
  - Schedules for delivering/updating models
  - Choices re: dimensional accuracy
  - Protocols re: file formats, naming, software, interoperability, deliverables, Project Web site, etc.

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## ConsensusDOCS 301 BIM Addendum



- Risk Allocation
  - Each contributor responsible for its own model contributions
  - Can rely on accuracy in Design Models
- Intellectual Property
  - Each party grants licenses to use model for project
  - No loss of copyright implied
  - Owner's license NOT limited to the project
  - Non-paying owner has to be adjudged in default

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## Traditional Design & Construction Structure



- Owner+Arch+Builder
- + Many Trades



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## Traditional Risks



- **Known and Well Understood**
  - Bright line between design and construction
  - Allocate cost risk to party best able to control it
  - Spearin Doctrine
  - Standard of Care
  - First-party insurance
    - PL insurance
    - Direct Contractor/Architect claims usually not possible
  - Third-party claims
    - PL insurance
    - CGL insurance

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## Traditional Professional Liability Coverage

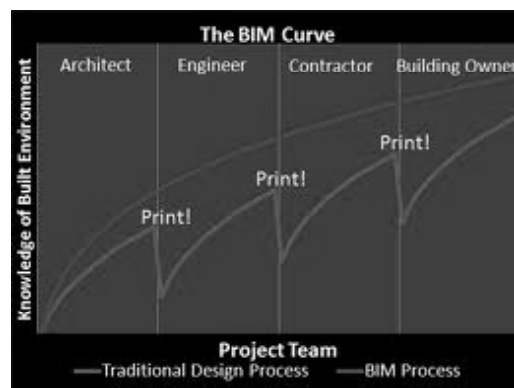


- Claims made against the named insured
- Arising from negligent performance of professional services
  - Negligence = breach of the applicable “standard of care”
    - similarly situated professionals performing similar services under similar circumstances
  - Expert witness testimony is generally required to show
- PL insurance does not cover “contractual liability”
  - Promises made by contract that go beyond what a professional would be required to do under the common law in the absence of a contract
    - Guarantees and warranties of perfection
    - “Time is of the essence” provisions
    - Assumption of liability for another’s mistakes

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## Traditional Handoffs from Silo to Silo



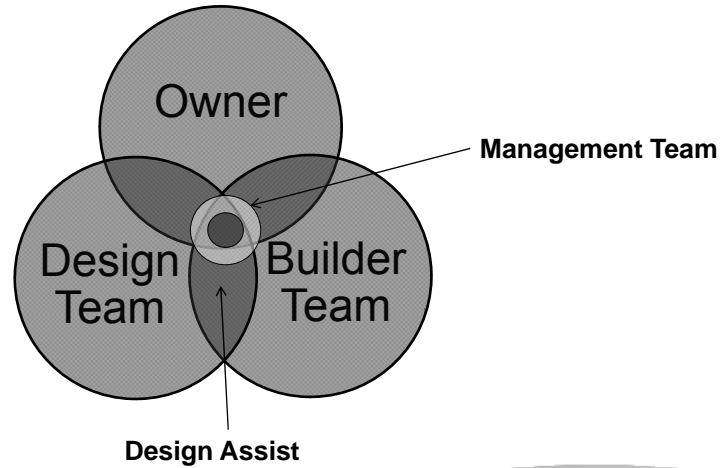
Every handoff creates a drop in efficiency

Working as a team will reduce this waste

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## Integrated Team Structure



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## Published IPD Contracts



- AIA A295 Transitional IPD (Not a multi-party agreement)
- AIA C195 Single Purpose Entity (LLC)
- AIA C191 Multi-Party Agreement
- Sutter Health Integrated Form of Agreement (IFOA)
- ConsensusDOCS 300
- HansonBridgett ([www.hansonbridgett.com](http://www.hansonbridgett.com))

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## Attributes of Integrated Agreements



- Break down the silos—drive out waste/inefficiency
- No bidding—team selected by QBS/Best Value with interviews
- Trade contractors participate in design
- Designer, Contractor, Owner, Key Trades = Management Team
- Management Team unanimous or consensus decisions:
  - Sets project goals
  - Validates owner's program
  - Makes all decisions regarding design, cost, and schedule
- Intensive early planning/design to target cost/virtual construction
- Target Cost, not Guaranteed Maximum Price
  - Owner, Designer and Contractor share the risk of cost/bonus rewards
  - Time and Material "open book" accounting
- Liability may be limited
- First-party claims may be waived

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## IPD Benefits (aspired to)



- Well defined design scope
- More accurate cost estimates
- Better communication
- More transparency—no secrets
- Parties that are motivated to achieve project success
- Lower total cost
- Shorter schedule
- Fewer claims
- No litigation

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## Risks to the Integrated Team



### ● Not Well Understood

- Line between design and construction is blurred
  - Design assist
  - Means and methods
- Design and Construction Team may share risk of construction overruns
  - Is the risk capped?
- First-party claims may be waived
  - If not, Contractor/Architect claims may be possible
- What if the contract requires correcting errors and omissions at no cost to owner?
- Insurance for third-party claims
  - PL and GL upon finding of negligence, which requires traditional finger pointing

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## Insurance Coverage Issues



- PL policy excludes contractual liability
  - A/E may assume means and methods liability
  - Contractor may assume design liability
- PL Policy will only cover damages caused by the insured party
  - Promises to share risks/rewards = taking on the liability of others
- PL Policy requires a “claim”
  - Won't cover losses arising out of risk pools or cost sharing
    - Using profits to fix mistakes = self-insurance
- Professional liability coverage depends upon a court or finder of fact determining liability/negligence as a matter of law
  - Contrary to cooperative spirit of IPD
    - No-fault insurance not available
- CGL coverage excludes professional liability—will not cover DP
  - Contractor to get its own PL insurance

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## Sutter Health Agreement Integrated Form of Agreement (IFOA)



- Of all, this takes most control over design/construction process
- Lean Construction principles ([www.leanconstruction.org](http://www.leanconstruction.org))
  - Target Value Design, pull-based design and construction, etc.
- IPD Team (includes O, A, C + consultants, subs, suppliers)
- Core Group (O, A and C) manages the project by consensus decisions
- Cross functional teams design to detailed estimates
- Target Cost may not be exceeded
- Errors/omissions and contractor mistakes:
  - Owner funded contingency; If exceeded
    - At Risk Pool: profits put in escrow are used to correct/reimburse owner
    - At Risk Pool = Limit of Liability
- Claims not waived

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## ConsensusDOCS 300



- Inspired by Sutter Health contract, but fewer Lean requirements
- Project Target Cost Estimate set when drawings complete
- Check box risk allocation
  - Safe Harbor or Traditional
- Costs and normal profit paid—not escrowed in risk pool
- Savings are shared (extra profit)
- Contract terms vary substantially depending upon check box choices
- Checkbox options for sharing Project losses:
  - Cost overruns may be shared/borne by owner
  - Profit is/is not a limitation of liability
- Financial incentive program funded by savings

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## CD300 Collaborative Risk Allocation Option



- 3.8.1.1 SAFE HARBOR DECISIONS For those **Project risks arising from collaboratively reached and mutually agreed-upon Project decisions made by the Management Group** (Safe Harbor Decisions), **the Parties agree to release each other from any liability** at law or in equity for any non-negligent act, omission, mistake or error in judgment, whether negligent or not, acting in good faith, in performing its obligations under this Agreement except to the extent such act or omission amounts to a willful default of an obligation under this Agreement.

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## CD300 Traditional Risk Allocation Option



- 3.8.1.2 TRADITIONAL RISK ALLOCATION **Each Party shall be fully liable for its own negligence and breaches of contract and warranty** arising from the performance of this Agreement, to the extent provided for under the law of the jurisdiction in which the Project is located, except to the extent as otherwise limited as set forth below: (Indicate Applicable Exception).
- If Traditional risk is chosen, then a LoL may apply

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## AIA: Three IPD Agreements



### Transitional Forms

- Separate O/A and O/C Agreements require collaboration
- All duties in shared General Conditions Document
- GMP-based contract w/pre-construction services

### Single Purpose Entity Full Integration

- New paradigm, unique
- Single Purpose Entity/LLC
- LLC indemnifies parties
- All profits at risk
- Most claims are waived

### Multi-Party Agreement

- Similar terms to SPE, without forming LLC
- Responsibilities outlined in General Conditions
- Most claims are waived

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## AIA SPE and Multi-Party Agreement Overview



- Owner, Architect, CM or Contractor, others may join
- Project Management Team develops Project Goals, Project Definition, Work Plan, and Risk Matrix, manages project
- Unanimous decision making (owner carve-out/impasse breaker)
- Complete Integrated Scope of Services matrix assigning all services
- Parties are paid all costs, including indirect costs/Profits at risk
- Agree on the Target Cost or dissolve the SPE/terminate the MPA
- Owner funds cost overruns
- Owner funds goal achievement compensation (not based on savings)
- Most claims are waived, claims covered by insurance not waived
- All disputes must be resolved internally, not in court

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## IPD Considerations



- Consider the team
  - Prior performance is best predictor of future success
- Risk/reward sharing
  - Will your costs be paid?
  - Who controls the contingency?
  - Is your profit at risk?
  - Will the target cost become a GMP—will you be at risk?
  - Is your liability limited, if so, to what?
  - Is the potential reward worth the risk?
- Are claims waived?
- What do your broker and carrier have to say?

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## Questions?



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