Alliance for Construction Excellence &
RH & Associates, Inc.

Understanding Project Delivery Methods

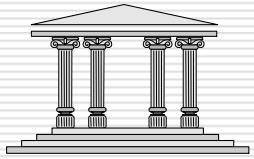
Alternative Project Delivery Methods

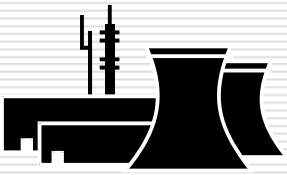
Project Delivery

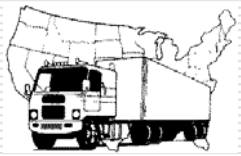
Why Does It Matter?

Project Delivery
Historical Perspective

Code of Hammurabi Design-Build	Classical Greece Design-Build	Middle Ages Cathedrals Design-Build	Renaissance Emergence of Design-Bid Build	Private Sector Re-emergence of Design-Build	Public Sector Re-emergence of Design-Build	Emergence of CMAR & JOC	Passage of Federal Acquisition Reform Act	Most States Have APDM Legislation
1800 B.C.	450 B.C.	1200 A.D.	1450	1960s	1980s	1990s	1996	2000+







Alternative Project Delivery Methods

A Quick Look at Partnering

Low Bid vs. Partnering
World Class (late 1980s – early 1990s)

Category	Result Area	Results
Cost	Total Project Cost (TPC)	10% reduction
	Construction Administration	24% reduction
	Marketing	50% reduction
	Engineering	$10 per hour reduction
	Value Engineering	**337% increase**
	Claims (% of TPC) - $	87% reduction
	Profitability	25% increase
Schedule	Overall Project	20% reduction
	Schedule Changes	48% reduction
	Schedule Compliance	Increased from 85% to 100%
Safety	Hours without lost time accident	3 million vs. 48,000 industry standard
	Lost work days	4 vs. 6.8 industry standard
	Doctor Cases	74% reduction
	Safety rating	5% of national average

Source: Construction Industry Institute
RS 102-1 (1996)

Low Bid vs. Partnering
World Class (late 1980s – early 1990s)(con't.)

Category	Result Area	Results
Quality	Rework	50% reduction
	Change Orders	80% reduction
	Direct work rate	42% increase
Claims	Number of Claims	83% reduction
	Projects with claims	68% reduction
Other	Job satisfaction	30% improvement

Source: Construction Industry Institute
RS 102-1 (1996)

Alternative Project Delivery
Why does it matter?

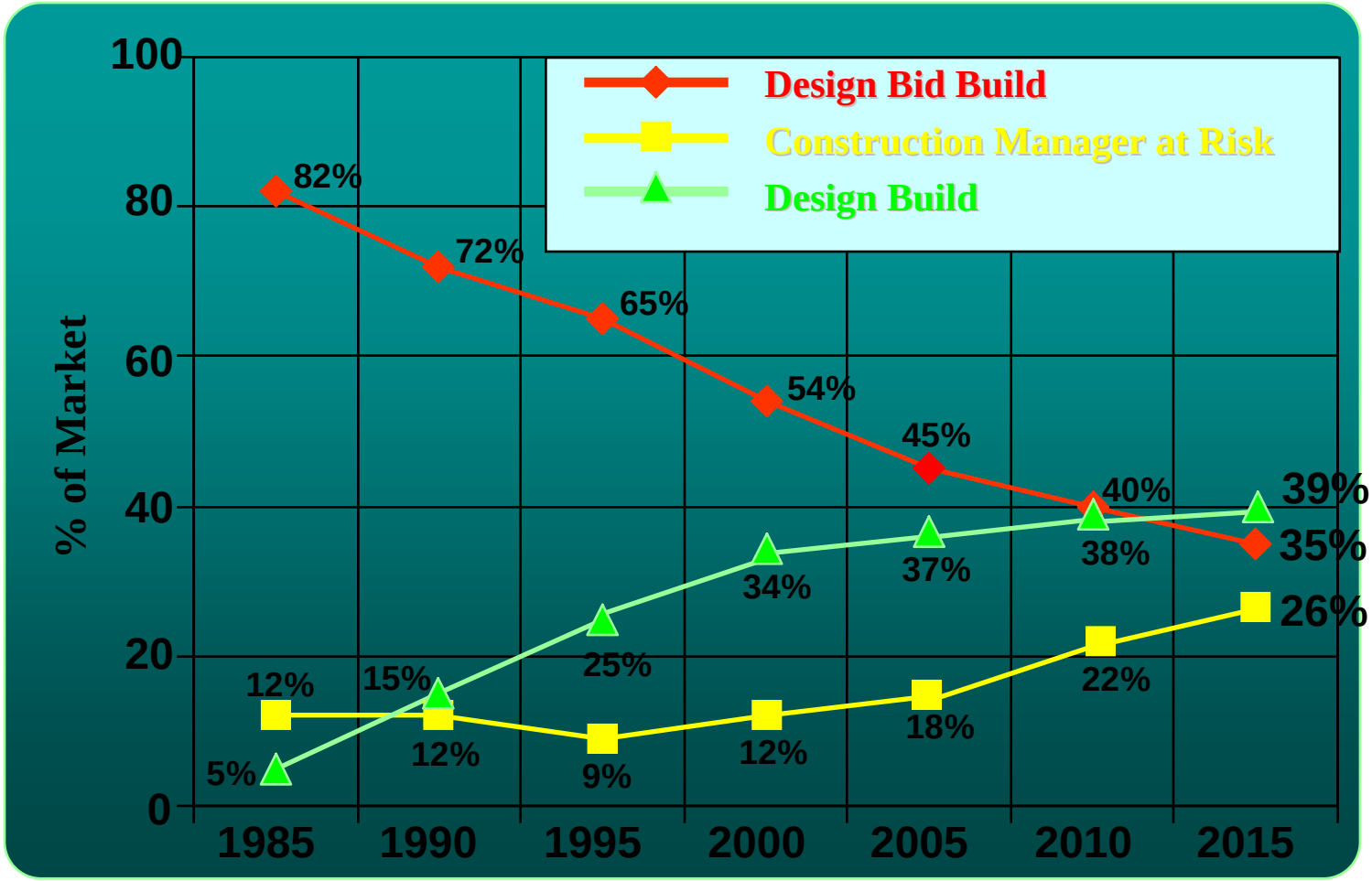
- Why not use a project delivery method that embraces partnering and teaming concepts?

Alternative Project Delivery Methods

Trends in the Public Sector Market:

- Design Build (DB)
- Job Order Contracting (JOC)
- Construction Manager at Risk (CMAR)

Project Delivery Systems*



Pubic Works Projects

** Engineering News Record*
Modified by ASU

APDM Becomes Law in Arizona

HB 2340 was passed and became law August 15, 2000.

Arizona APDM Projects

- **Contracted or Identified Since 8/15/00:**

- **ADMINSTRATION/GENERAL PROJECTS = $3.0B**
- **HEAVY/HIGHWAY PROJECTS = $ .7B**
- **REC./ENTERTAIN. PROJECTS = $ .6B**
- **SCHOOLS = $1.1B**

- **TOTAL APDM = $5.4B**

- **CMAR = 61% DB = 37% JOC = 2%**

Project Delivery Methods & Processes

Processes

Delivery Method	Qualifications Based Selection	Price Competition Selection
Design Bid Build:	None or Pre-Qualified Select Bidders' List and then Price	Low Bid
Design Build:	QBS only & Negotiated Contract	QBS & Design Competition & Price
Construction Manager at Risk:	QBS only & Negotiated Contract Opt. out at GMP	None
Job Order Contracting	QBS only & Negotiated Contract	QBS & Coefficient Competition

Alternative Project Delivery Methods

- **A Quick Look at Qualification Based Selection**

Qualifications Based Selection for APDM Projects

- Use of sophisticated technology in construction is rapidly increasing
- Construction is becoming highly specialized:
  - "Smart buildings"
  - Environmentally responsible construction
  - Need for flexible-use
- Innovative solutions are needed when:
  - Complex options must be considered
  - Technology changes very quickly

Qualifications Based Selection is no longer a luxury, but a necessity.

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Qualifications Based Selection for APDM Projects

Selection criteria used should meet these basic requirements:

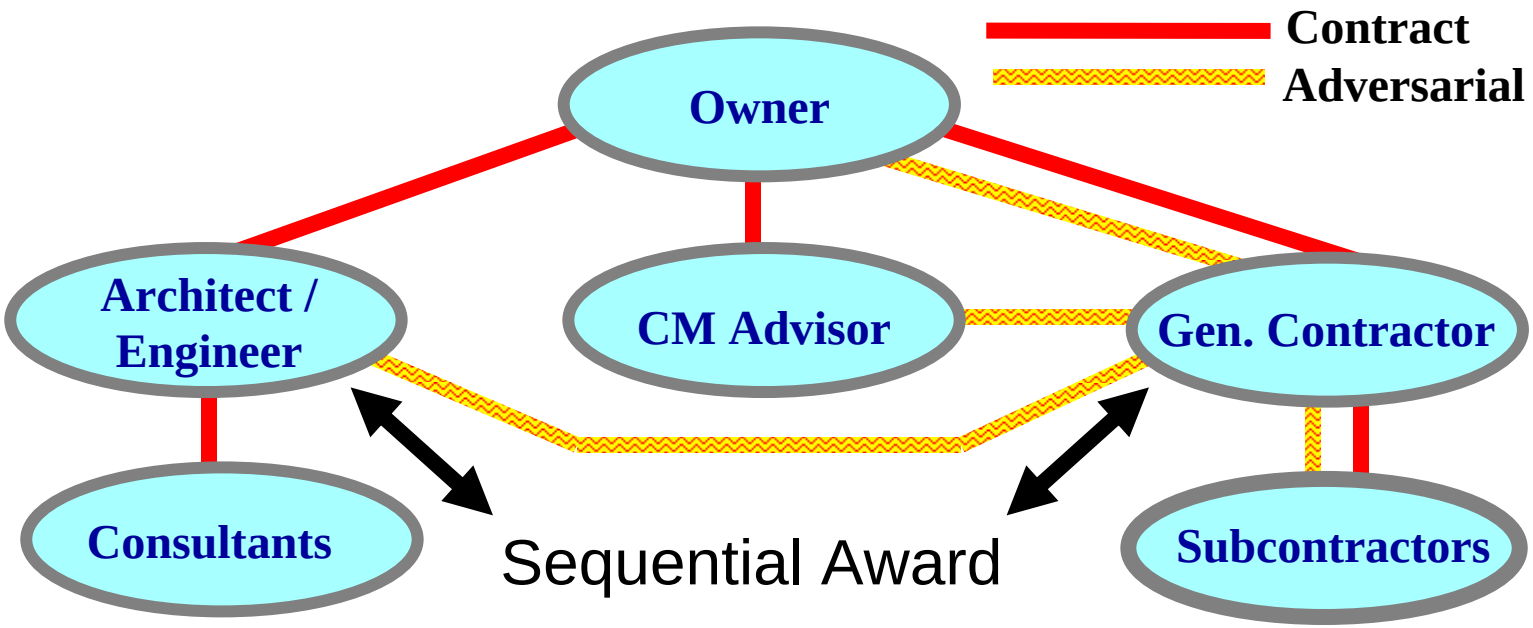
- **They must reflect an aspect of performance that is important to project success.**
- **Each criterion must be as objective as possible for the type of variable being measured.**
- **The weighting of each criterion should reflect its importance to the project and its potential impact on project success.**
- **Provide a level playing field and a fair process.**

Qualifications Based Selection for APDM Projects

Typical Selection Criteria:

- Offeror's qualifications and past performance (including references)
- Qualifications of key personnel
- Financial status
- Safety record
- Quality assurance program or quality management plan
- Project management methods
- Information technology systems

Design Bid Build



- Architect/Engineer (Qualifications Based Selection)
  - Design services
  - Management of bid process
  - Construction administration
- General Contractor / Subcontractor (Low Bid)
  - Construction

Design Bid Build
Methodology Considerations

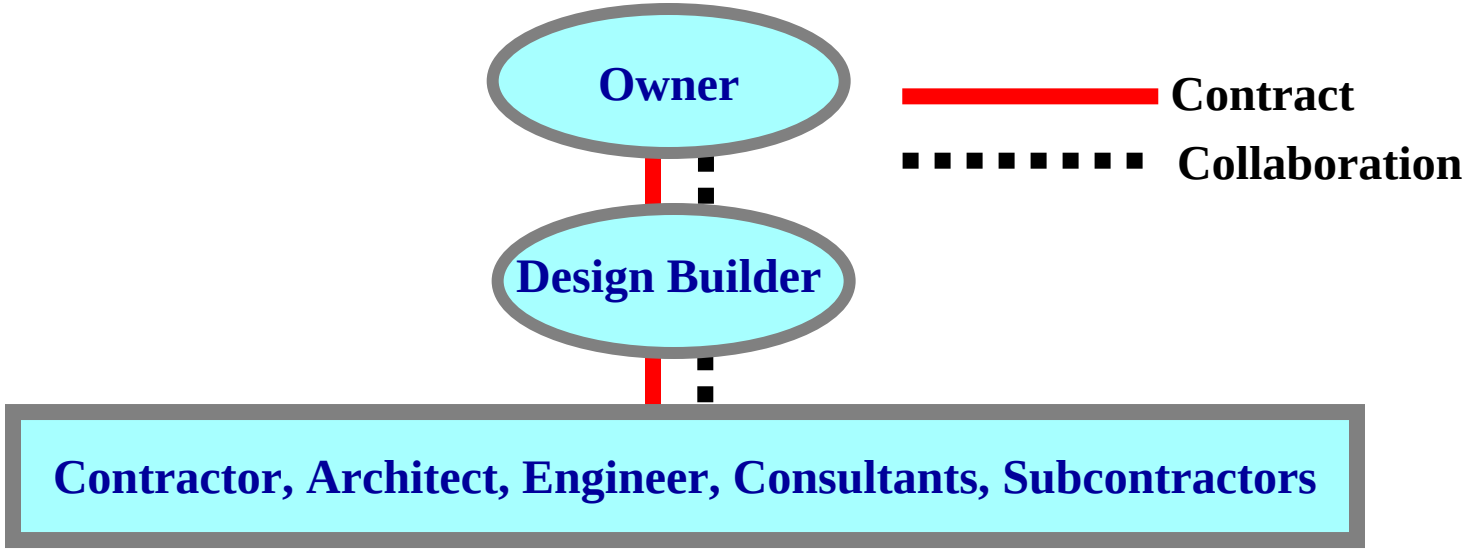
Characteristics

- Linear process
- Owner's involved in design phase
- Separate contracts help define responsibilities
- Competitive bids

Concerns

- Costs not known until after design
- Contractor's knowledge is missing from design
- Delays in linear process effect whole schedule
- Can create adversarial relationships

Design Build (GMP or Lump Sum)



Design Build (QBS or Best Value)

- Design services and construction services
- Management of design services
- Management of bid process & trade subcontracts
- Open book or lump sum

Basic Difference
Contract Language

Design Bid Build

- The owner warrants to the contractor that the drawings and specifications are complete and free from errors.

Design Build

- The design builder warrants to the owner that it will produce documents that are complete and free from errors.

Basic Difference - Approach

Design Bid Build

- Any Problem With Design = $ Profit
- Make the Problem Bigger = $$ More Profit

Design Build

- Any Problem With Design = $ Lost Profit
- Quick Resolution = Fewer $ Lost

Design Build

Methodology Considerations

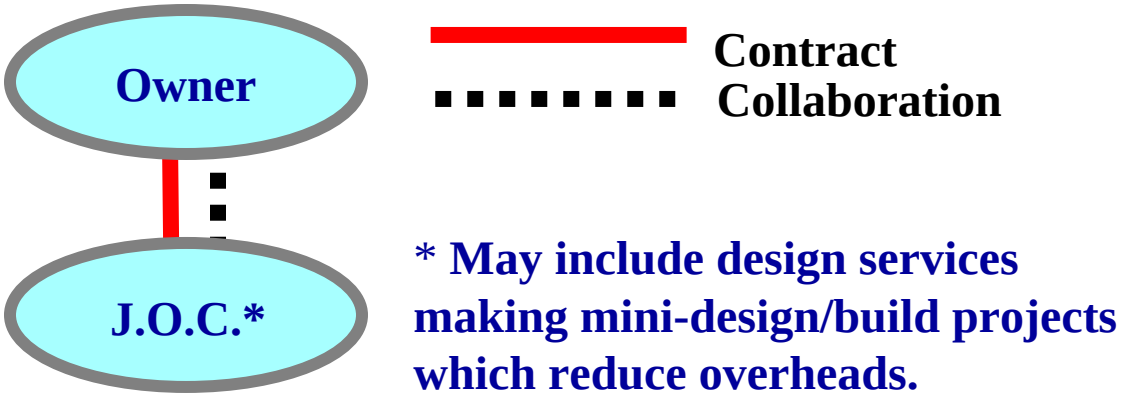
Typical DB Benefits

- Mirrors CMAR, plus
- **Early knowledge of price – 2 step process**
- **Competitive Design Innovation – 2 step process**

Success Elements

- Recognition and understanding of the complexity of the process
- Owner must have experience in controlling a design builder.
- Owner must limit their involvement in and direct control of design
- Pre-selection documents must be well defined
- Owner must embrace partnering relationship with the design build team
- Architects/engineers are subcontracted to the GC – not owner's rep.
- **Quality/cost trade offs are internal to the Design Builder**

Job Order Contracting
(Service Agreement)



- Job Order Contracting (QBS or Best Value)
  - J.O.C. contractor will perform on multiple projects
  - Work quantities will be unknown at the time of award
  - Trade subcontractor may perform as J.O.C. contractor
  - Finance services, maintenance services, operations services, preconstruction services, design services and other related services may be included.*

Job Order Contracting

Methodology Considerations

JOC Benefits:

- Responds rapidly to owner's needs and schedules.
- Reduces backlog of maintenance, repair, and renovations.
- **Know costs before committing funds.**
- Decrease up-front costs while maximizing the $ to in-place construction and local subs.

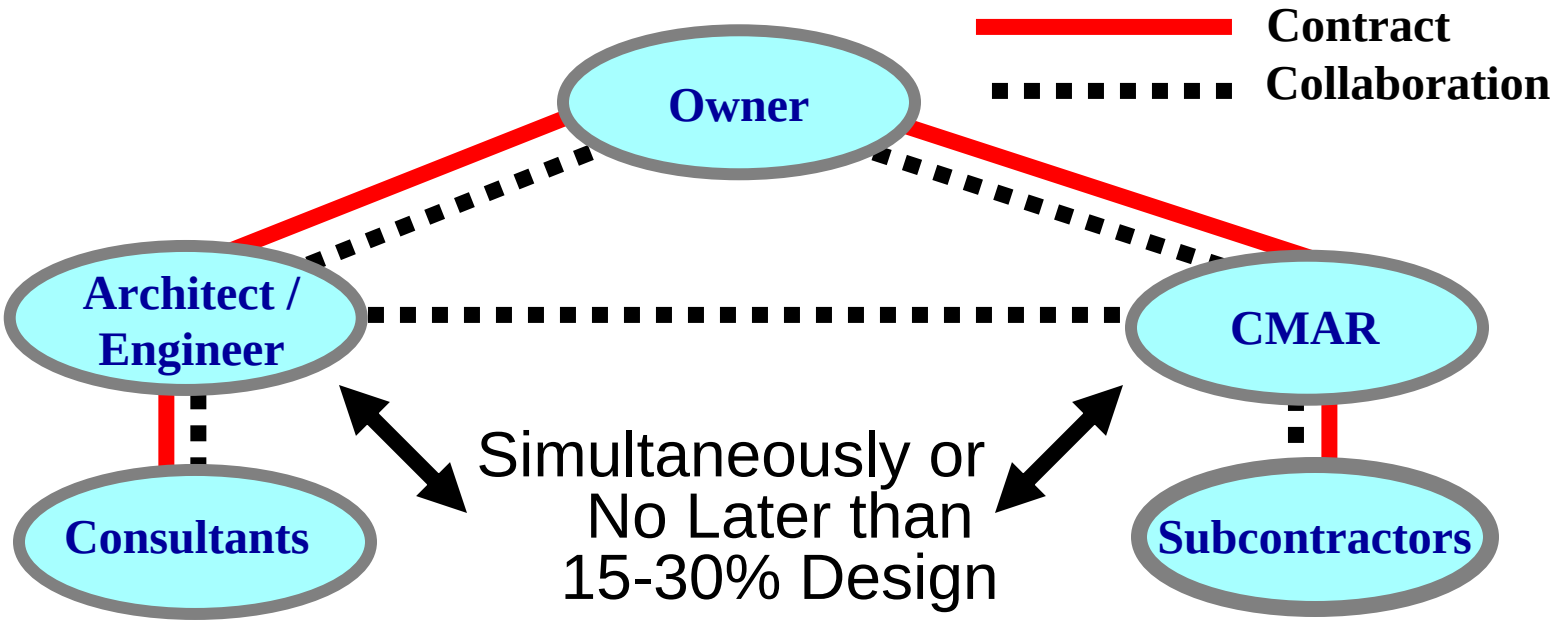
JOC Characteristics:

- Typically one contractor
- **Database oriented**
  - **Missed items**
  - **Forced items**
  - **Included / Not included**
- Typically multi-year

Success Criteria:

- Relationship based
- Requires checks & balances

Construction Manager at Risk



- Architect/Engineer (Qualifications Based Selection)
  - Design services with active CMAR participation
  - Some construction administration
- Construction Manager at Risk (QBS + Negotiated Contract)
  - Preconstruction services & construction services
  - Management of bid process & trade subcontractors
  - “Open Book” philosophy
  - Finance services, maintenance services, operations services, and other related services may be included.

Construction Manager at Risk
Methodology Considerations

Benefits

Typical APDM Benefits:

- Team approach from the start
- Increased owner control
- **Value engineering (innovation)**
- Controlled purchasing
- "Open book" financial approach
- Fewer Claims/Litigation
- Improved collaboration
- Common goals and objectives
- **Increased value for each dollar spent**
- Shorter project schedules
- Improved construction quality
- Construction planning
- Phased construction option
- Fewer warranty problems
- Improved service response to owner

Unique to CMAR:

- Change management by owner advocate
- Strong "check & balance“
- **Continuous budget control**
- Quality/cost tradeoffs are within owner control

Success Elements

- Owners become involved with contractors during design phase
- **The roles of the CMAR & A/E in pre-construction need to be clearly defined**
- Owners must be comfortable with "at-risk" contracts
- GMP factors that must be considered:
  - Timing of GMP
  - Contingency level
  - Avoid confusion of design vs. construction responsibility
- **Owners must have a strong basis of the project estimate**
- Owners must embrace a partnering relationship with the contractors

CM at Risk – Lessons Learned

- **The Benefits from a 3rd Party Perspective**
  - Much more of a team approach
  - Fewer RFI's
  - Fewer design/construction related changes
  - Improved long term relationships
  - Client is getting more of what they want
  - The team is able to honestly discuss costs (including escalation)

CM at Risk – Lessons Learned

- **The Benefits from a 3rd Party Perspective**
  - Great construction means, methods and materials input during design
  - Multiple GMP approach (phasing opportunities)
  - Better quality project overall
  - Open book philosophy makes owner's more comfortable

CM at Risk – Lessons Learned

- **The Benefits from a 3rd Party Perspective**
  - Reduced involvement from design team during construction
  - Lower costs in today's market

CM at Risk – Lessons Learned

- **The Benefits from the Owner**
  - Enhanced Communication
  - Much More Budget Control
  - Enhanced Control of Subcontractor Selection
  - More Cost Effective Construction Estimates
  - Owner Gets More of What They Want

CM at Risk – Lessons Learned

- **Challenges from a 3rd Party Perspective**
  - Team gets into more of a cost reduction mode than a value engineering mode
  - Roles and responsibilities not totally understood
  - Contractors having challenges with conceptual cost estimating
  - Team members not expressing their expectations adequately (process and roles & responsibilities)

CM at Risk – Lessons Learned

- **Challenges from a 3rd Party Perspective**
  - Still too many RFI's
  - Additional time requirements for design team with the contractor
  - The misconception that Partnering is not needed as much
  - Contractors not understanding their true role in budget management

CM at Risk – Lessons Learned

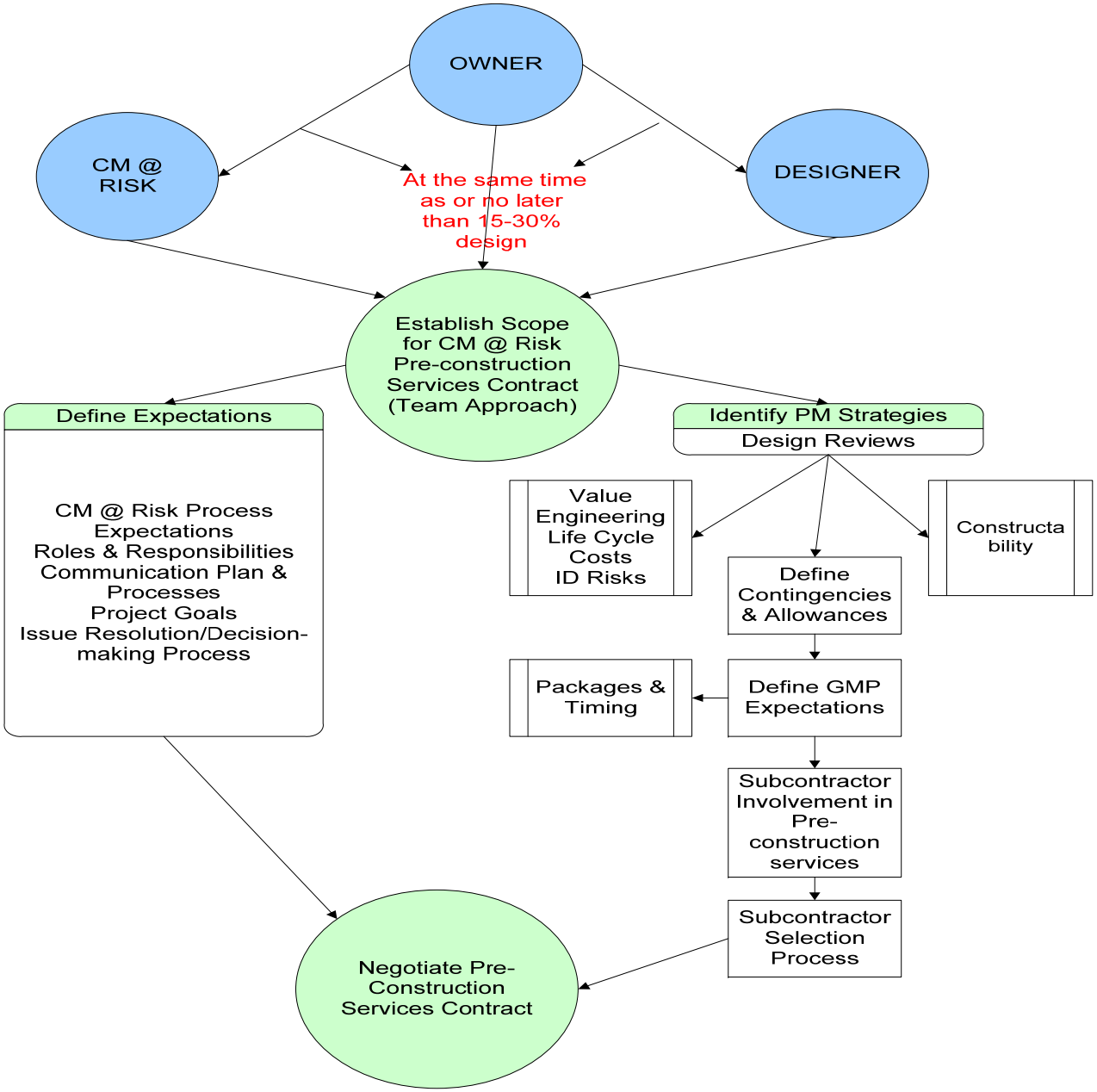
- **Challenges from a 3rd Party Perspective**
  - New contractors to the methodology not able to get work
  - Truly identifying the expected scope during pre-construction services
  - The contractor being selected too late in design

CM at Risk – Lessons Learned

- **Challenges from the Owner**
  - Subcontractor Roles Have Changed
  - Contractors Not Understanding Pre-Construction Services
  - New Skills Required by the Owner's Staff
  - Design to Budget
  - Getting Upper Management to Understand the Process Fully (contractor under contract with no construction going on)

CM at Risk – Lessons Learned

- **Things to Consider for the Future**
  - A scoping meeting with the CMR and the team to develop
    - Roles & Responsibilities
    - Methodology/Process Expectations
    - Communication Plan
    - Scope/Responsibility Matrix
    - Project Goals
    - Development of a Project Charter


OWNER
CM @ RISK
DESIGNER
At the same time as or no later than 15-30% design
Establish Scope for CM @ Risk Pre-construction Services Contract (Team Approach)
Define Expectations
CM @ Risk Process Expectations
Roles & Responsibilities
Communication Plan & Processes
Project Goals
Issue Resolution/Decision-making Process
Identify PM Strategies
Design Reviews
Value Engineering Life Cycle Costs ID Risks
Constructability
Define Contingencies & Allowances
Packages & Timing
Define GMP Expectations
Subcontractor Involvement in Pre-construction services
Subcontractor Selection Process
Negotiate Pre-Construction Services Contract

CM at Risk – Lessons Learned

- **Things to Consider for the Future**
  - Partnering is an effective tool but the format needs to change
  - Additional time for design team
  - Define what the GMP means
  - Define the Contingency items, how they are spent and where any remaining dollars go
  - Look for opportunities to introduce new contractors into the mix

CM at Risk – Lessons Learned

- **Things to Consider for the Future**
  - Do a lessons learned after every project
  - Focus on applying true value engineering
  - Select the CMR firm around the same time or no later than 15% into the design
  - 3rd party cost estimates (It's not about trust!)

Alternative Project Delivery
Why does it matter?

Used Properly APDM can:

- Reduce schedules
- Reduce cost overruns
- Reduce design errors & omissions
- Reduce RFI's
- Reduce material impacts
- Reduce change orders
- Reduce warranty problems
- Reduce claims & litigation
- Can be a lot more fun!

Note: Claims and litigation on design bid build projects through the early 1990's amounted to 20 cents on the construction dollar (Ref. PM Journal, Sept. 1994). Today the number of claims is down, but the amount of the awards are up.

Special Note: There have been NO claims or litigation on Arizona APDM projects since the enactment of the legislation with over $5 billion dollars in contracts!

Conclusion

APDM's are alternative delivery methods to design bid build. There is a strong national trend to use APDM's. They add to the tool box to help improve the success of project implementation, but are not a guarantee! With the right pre-project planning, the right people, the right selection process and the right team, the right pre-construction process, APDM should provide a better chance of project success!

Alternative Project Delivery Methods

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Alternative Project Delivery Methods

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