

› Making It Stand.



designing a world of hope

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Imagine.

In much of the developing world, the engineering industry is non-professional and the restraints of liability do not exist...

اور انگریزی کم استیمل کرتے ہیں۔



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› Before turning on your calculator...

Key elements impacting engineering design:

- Project Authority
- Client's Value
- Design "Reasonability"
- Plan Set Function



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» Before turning on your calculator...

Key elements:

- **Project Authority**

Understanding the relationships of authority, influence, actual control, and finance over the development project



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» Working with Project Authority

Main parties:

Client

Property owner / initiator of Development Project (DP) (often not very experienced with construction)

Government ?

Sometimes present government formalities, fees, regulations, or restrictions on the DP (usually non-technical or empirical)

EMI

Unpaid consultant professional architects / engineers invited to assist client in design of DP

Contractor

“Master builder” paid to construct DP (usually with local construction experience and high political / social status)

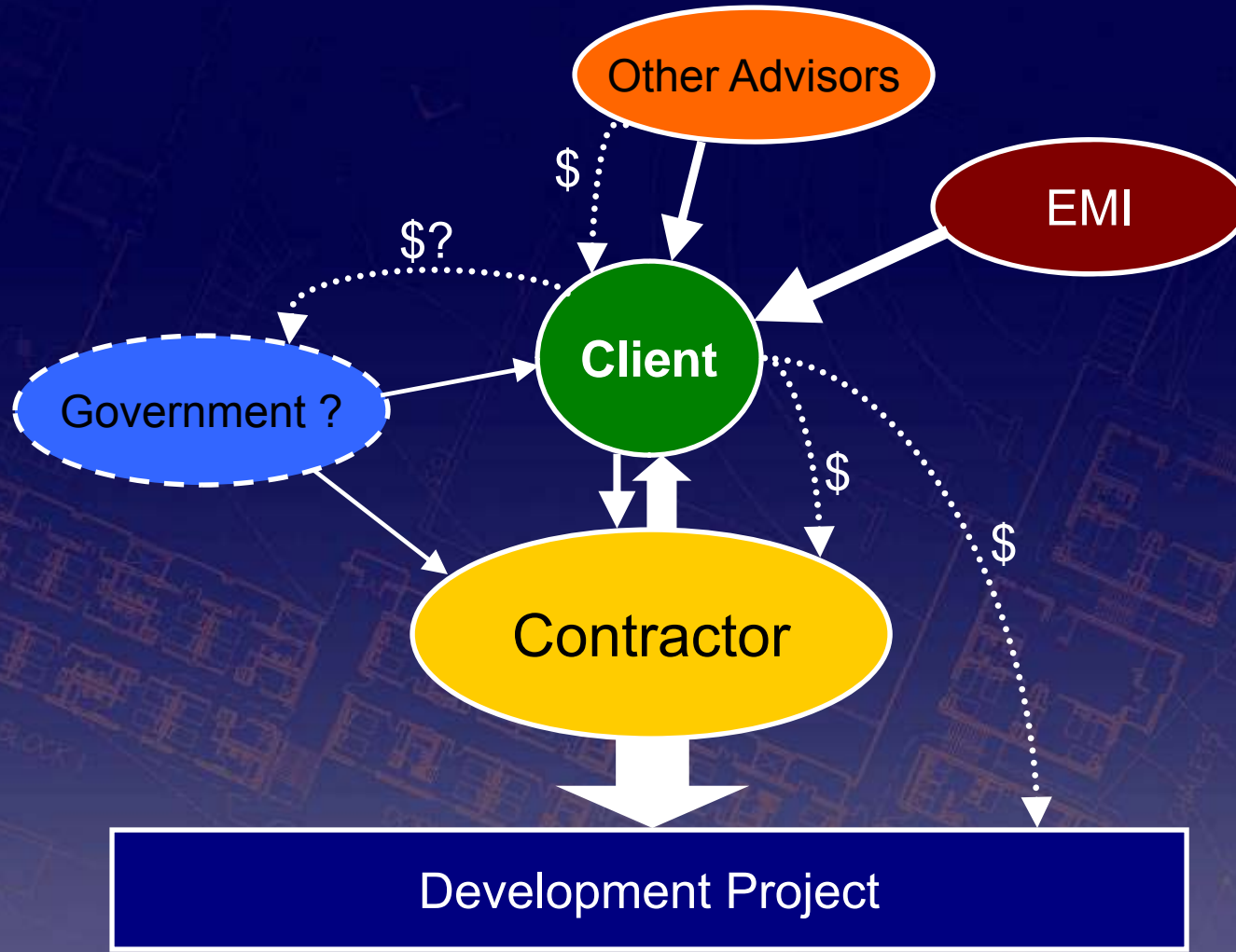
Other Advisors

Unpaid advisors assisting in design of DP, invited or uninvited (i.e. donor, architect nephew, father-in-law, peer leader, etc.)



» Working with Project Authority

Typical scenario:



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»Working with Project Authority

Observations:

- EMI impacts the development project only indirectly through the client, then contractor
- Other advisors (contractor included) can exert influence \geq EMI on client over DP design
- Legal or governmental requirements for the involvement of engineers is usually superficial



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› Before turning on your calculator...

Key elements:

- Project authority
- **Client's Value**

Understanding the client's value of and need for structural engineering input in the development project



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»Working with Clients

Sounding out value:

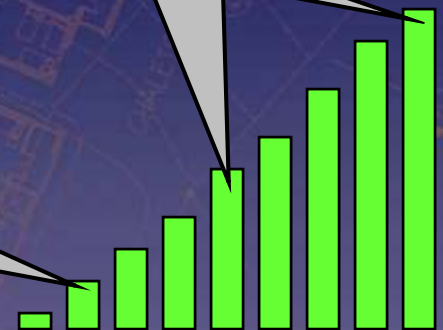
- Past experience in development projects

"We hired an engineer from the town but they didn't do much..."

"I'm not an engineer - we are relying on you people for that..."

"My father was both architect and engineer for the Word of Life Campus..."

Value Scale



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»Working with Clients

Sounding out value:

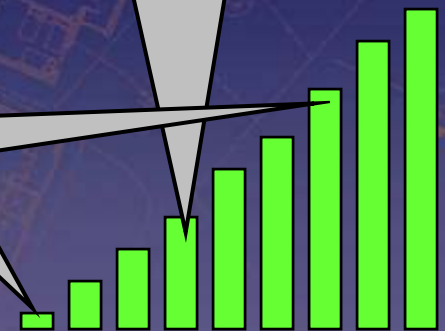
- Past experience in development projects
- Relationship and involvement of other advisors

“My father-in-law from Kerala is an engineer – can he help us in construction?...”

“The donor wants the facility to be earthquake-proof...”

“It’s an answer to prayer you have come to help us...”

Value Scale



»Working with Clients

Sounding out value:

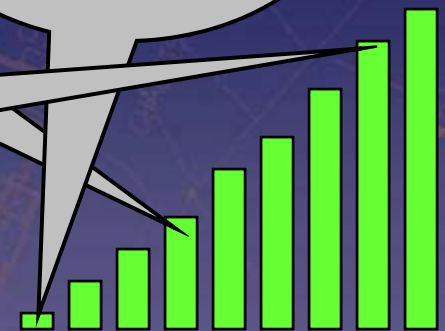
- Past experience in development projects
- Relationship and involvement of other advisors
- Interest in change, new ideas, improved methods

“In your country construction quality is very good...”

“In India, plastering is necessary for RCC work...”

“How can the dormitory be safe in earthquakes?...”

Value Scale



› Before turning on your calculator...

Key elements:

- Project authority
- Client's Value
- **Design "Reasonability"**

Developing a "reasonable" building design which is comparable to local construction

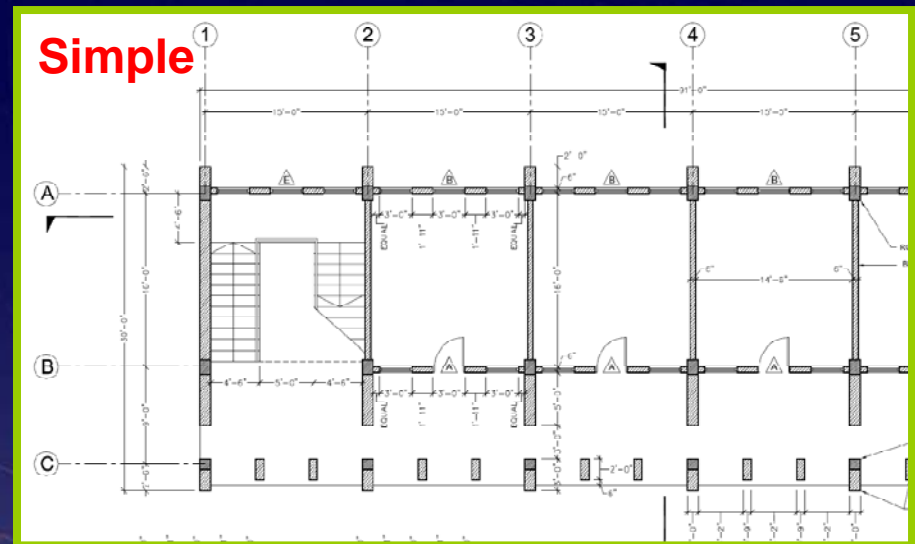
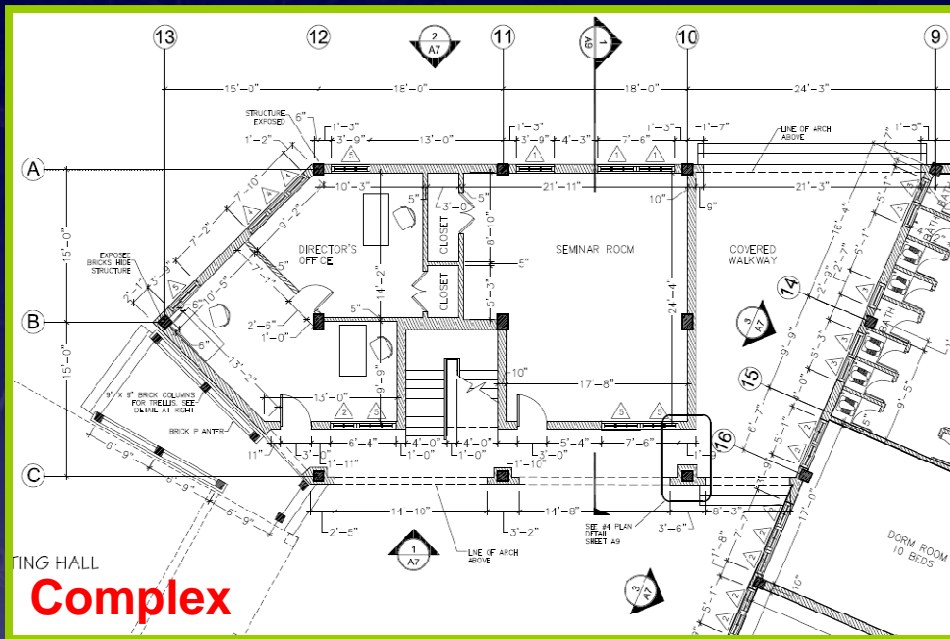


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» Working with Architects

Finding “reasonability”:

- Structure type, building design

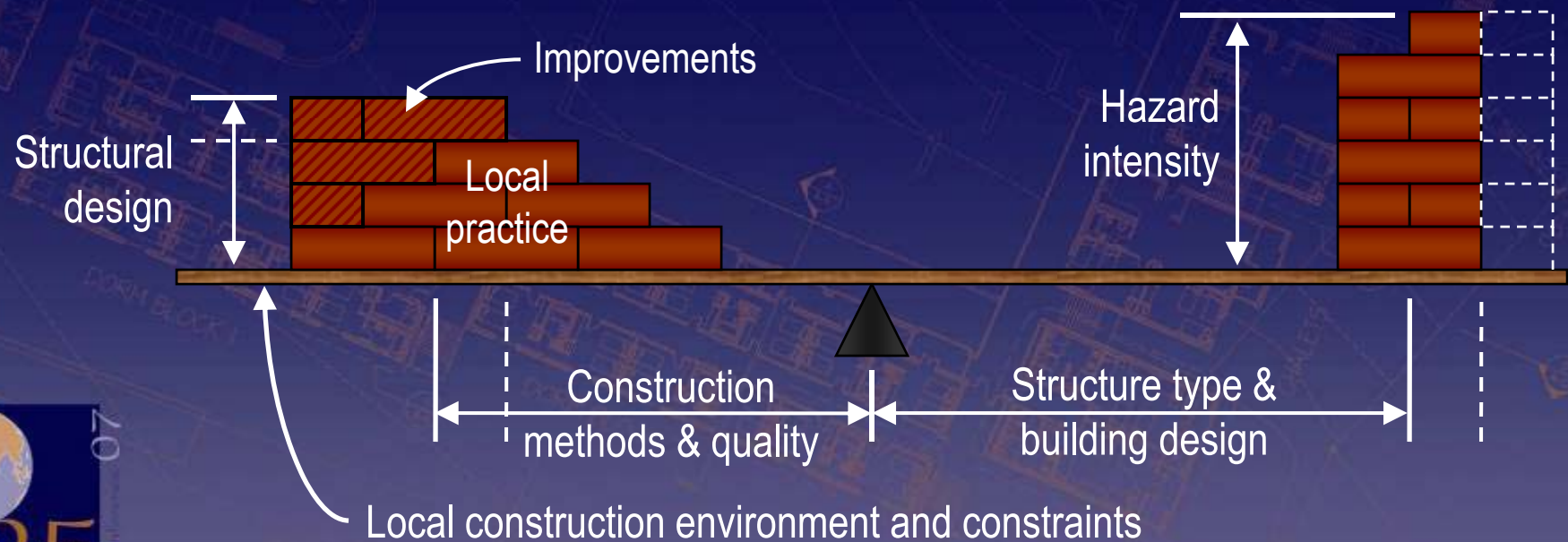


Complexities in the column grid usually produce compounded complexities in the structural framing

»Working with Architects

Finding “reasonability”:

- Structure type, building design
- Proposed design and local practice vs. hazard risk



»Working with Architects

Finding “reasonability”:

- Structure type, building design
- Proposed design vs. local practice vs. hazard risk
- **Construction means and methods**



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› Before turning on your calculator...

Key elements:

- Project authority
- Client's Value
- Design "Reasonability"
- **Plan Set Function**

Developing functional plans of the appropriate level of detail which are understandable in the local setting



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» Working with Plans

Developing देशी plans:

- Critical structural elements

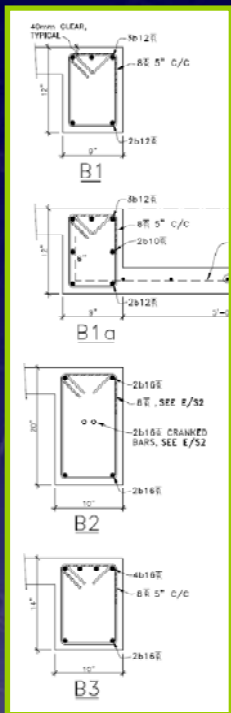
Focus plans to clearly communicate the critical structure element designs

Simple, typical details / sections

Appropriate dimensioning, regular as possible (structure plans and details)

Few section variations and notes

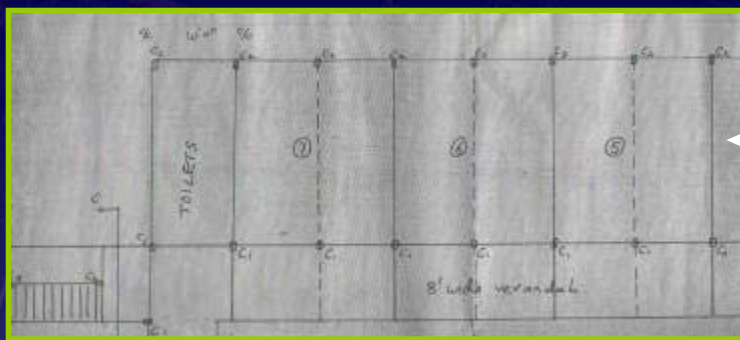
Few strategic construction method or quality improvements



Working with Plans

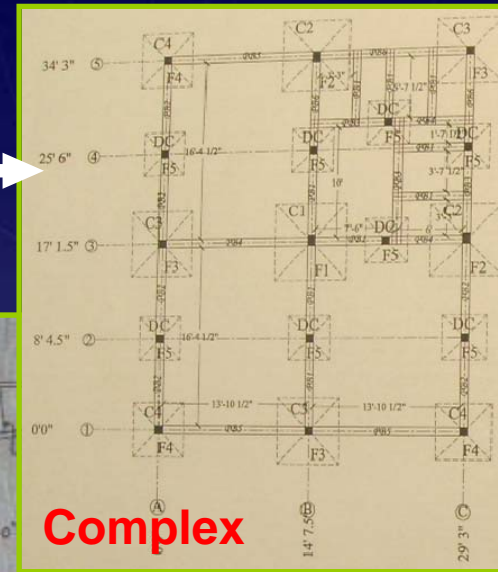
Developing देशी plans:

- Critical structural elements
- Function and appearance of local plans



Schematic

Detailed



Complex

SCHEDULE OF COLUMN SECTIONS :-

Column	CP	FP	TBS
C1	9"x12" 6-#16	9"x9" 4-#12	#8 @ 8" c/c
C2	9"x12" 4-#12	9"x9" 4-#12	#8 @ 8" c/c
C3	9"x9" 4-#12	9"x9" 4-#12	Ø6 @ 6" c/c
C4	9"x9" 4-#12	9"x9" 4-#12	Ø6 @ 6" c/c
DC	9"x9" 4-#12	9"x9" 4-#12	Ø6 @ 6" c/c

Note - Terminate all DC at Plinth Beam lvl

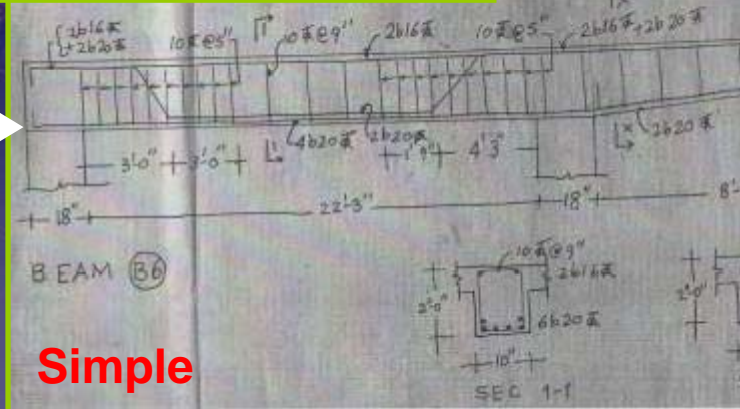
Schedule of Footings

footing	No.	W	L	D	h1	h2	CC	S	Bending length (BL)	Reinforcement in each direction
F1	7'0"	7'0"	6'0"	1'0"	1'0"	4"	4"	6"	2'	#12 @ 6" c/c
F2	6'0"	6'0"	6'0"	9"	1'0"	4"	6"	2'		#12 @ 6" c/c
F3	6'0"	6'0"	6'0"	9"	1'0"	4"	6"	2'		#10 @ 6" c/c
F4	5'0"	5'0"	6'0"	9"	9"	4"	6"	2'		#10 @ 6" c/c
F5	4'0"	4'0"	6'0"	9"	9"	4"	6"	1'6"		#10 @ 6" c/c

Plinth Beam Details

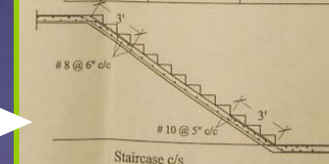
Plinth Beam	Size	Mid Span @ M-M Top / Bot	End Span @ E-B Top / Bot	Stirrups
PB 1	9" x 1'	2-#12 / 2-#12	2-#12 / 2-#12	Ø6 @ 6" c/c
PB 2	9" x 1'	2-#12 / 3-#12	3-#12 / 2-#12	Ø6 @ 6" c/c
PB 3	9" x 1'	2-#12 / 4-#12	4-#12 / 2-#12	Ø6 @ 6" c/c
PB 4	9" x 13"	2-#12 / 4-#12	4-#12 / 2-#12	#8 @ 6" c/c
PB 5	9" x 13"	2-#16 / 3-#16	3-#16 / 2-#16	#8 @ 6" c/c
PB 6	9" x 13"	2-#16 / 4-#16	4-#16 / 2-#16	#8 @ 6" c/c

Typical Beam Elevation



Simple

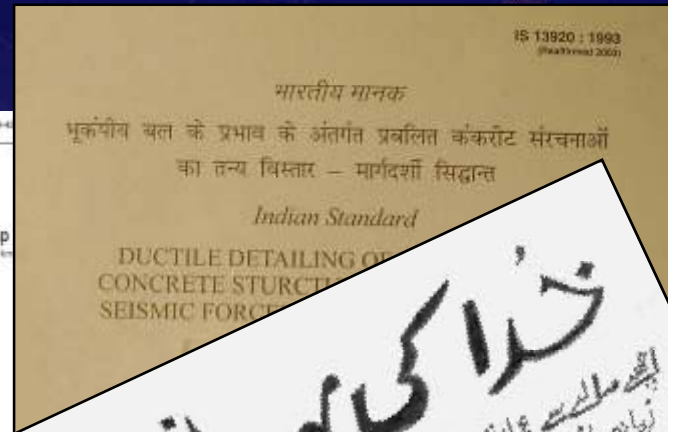
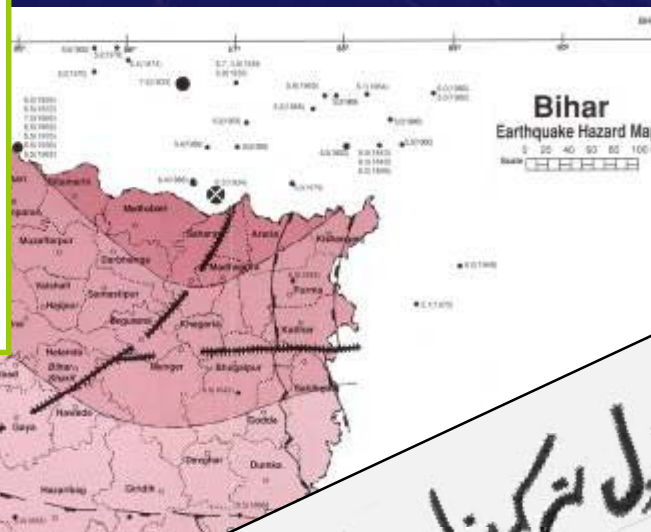
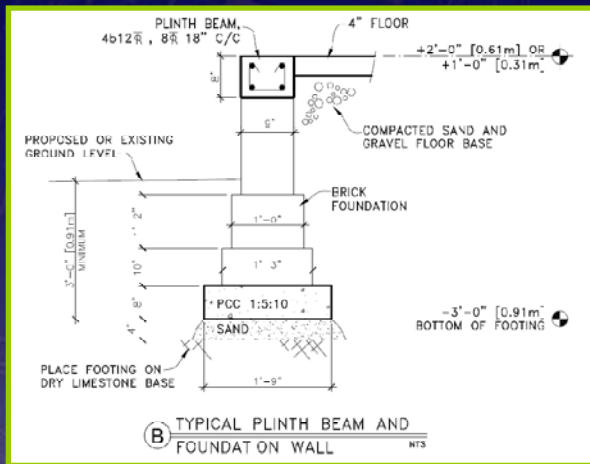
Beam Schedules



»» Working with Plans

Developing देशी plans:

- Critical structural elements
- Function and appearance of local plans
- Local language, units, symbols, codes, etc.



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› You may now turn on
your calculators.

›

› Thank you. |



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