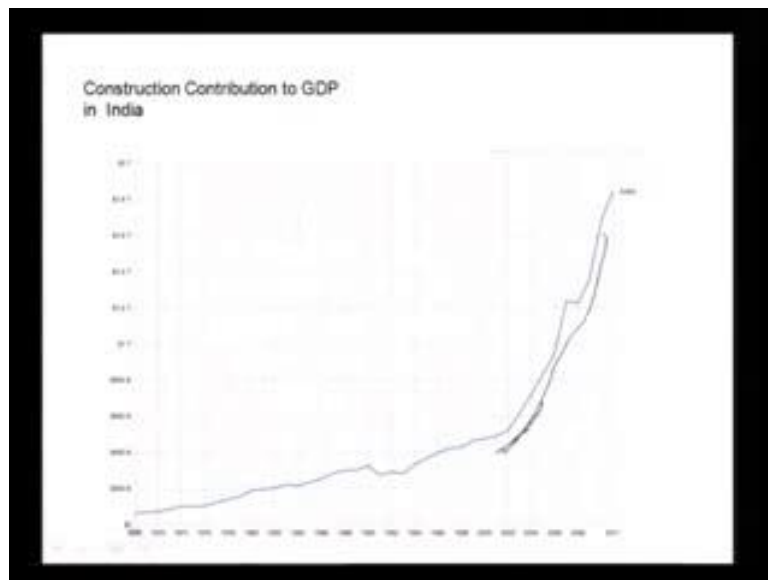


Project Planning & Control
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Lecture - 04
Construction Industry and National Growth

Okay, in this lecture will cover some characteristics of construction projects and the learning objectives are going to be to kind of get an understanding of the impact of the construction industry and the national growth especially in India.

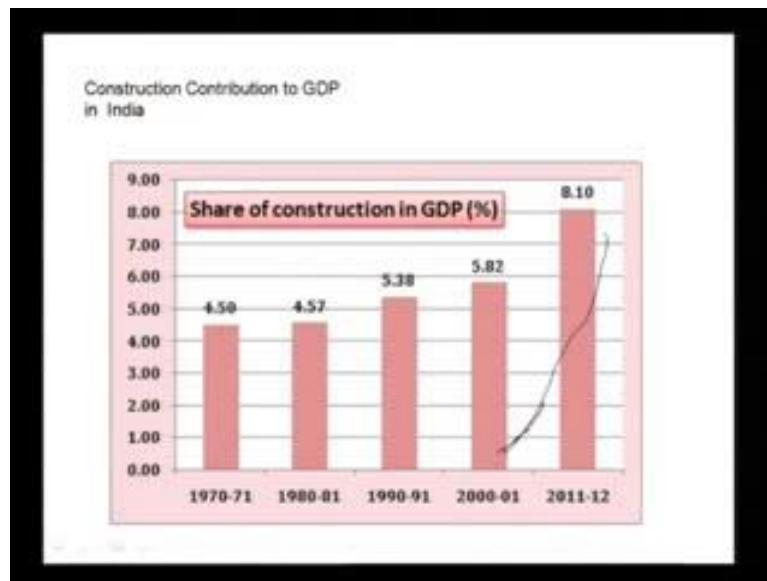
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Look at the projects stakeholders; you know who are the players who actually participate in a project and what they get out of the project. Look at the phases of a project; this is a very important part. Organization, how is a project organized and what are the aspects of project organization. And then finally, we actually we start getting into scheduling and understanding, what is a scheduling engineer do, what are the levels of scheduling and this will then lead us to the most focused part of, what we start from lecture three on the concepts of scheduling.

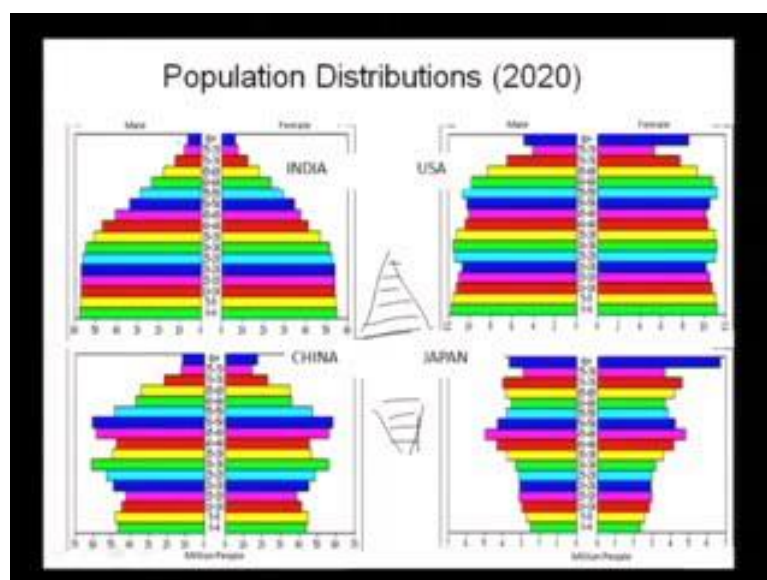
So, let us get started on the first objective. If we look at the national GDP you can kind of see the blue line, we have been you know since around 2002 we have actually been on this part, which is really skyrocketing upwards. So, this is the GDP and around here we have been skyrocketing upwards.

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Now, if you take this GDP pattern and overlay it with the growth of the construction share of the GDP, so when you go back we are close to 1.8 trillion dollars, and you will see the share of the construction industry has also been raising, and we are at nearly 8 percent of the GDP, which is a very, very high value. Okay, so, basically when we look at our economy, and we are saying that this is the contribution of the construction industry, which means that we are a very important industry for the nation.

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Now, it is not just from the GDP percentage, if you look at what we are going to be in 2020. So, this is a very interesting graph which... Are you exposed to this graph before?

Student: No

No, it is something which you want to be able to look at, and this is one reason why there is so much of interest in India. If you look at, so this is called a population pyramid and basically, what you have on the right on the each bar, so as you go up you have different age groups.

So, you have, for example, you know 0 to 4, 5 to 9, 10 to 14 different age group as you go up, and you have the population of people in this case in India and China it is in millions. So, it is actually in million people population and as you can see the green bar represents the number of people in the age group 0 to 4, the yellow bar 5 to 9. So, when you look at this graph what is the pattern you see, what makes India attractive as the place to invest in the future?

Student: You need to 60, know more of youth...

Yes, it says that there is a very, very young, so a population pyramid which is shaped this way means older people in our fewer, younger people are more. Population pyramid, which is this way means what, what is the mean to the economy of the county.

Student: Population decreasing....

The population is not necessarily decreasing; it is an increasing older age population. You can see in Japan's case, it is almost the older population is actually in some cases you can see the 45, 50 is more than the younger population. What is the mean in the future of the country?

Let say take it another 20 years, what does it mean.

Student: the working people..((Refer Time: 04:00))

Yes, the people who can generate revenue for the country will, people who are living who are unable to generate are more than the people who are able to generate if it is inverted parameter, in which case it is not a very good sign for the country, let us fundamentally something wrong. So, you will find that right now India is among all of these you can see India is in a very healthy reasonable pyramid, but you can actually go to web and project these for future, and you will find, how the population changes. This is only for 2020 Okay.

You can see China; it has you know because of their population policy; it is a varying population. You can see some of the African countries have almost a very classical pyramid; it is a real well pyramidal shape, but of course, populations are much lower. You can see, so the right side shows the female population, the left side shows the male population. So, in graphs like this are used to project what is going to be the situation in a country from an

economic perspective, from a growth perspective, from a development perspective, because finally, it is a population which thrives the whole issue. Any questions or clarifications on this observation?

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If we now go to this concept that without to support this population we need infrastructure development. So, whether we like it or not for that we mean, unless we develop infrastructure our people are simply not going to be able to sustain just living reasonable quality of life.

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So, when you go into infrastructure you will find you have familiar with this, we need roads, we need several 1000's of kilometers of roads.

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We need ports for trade.

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We need airports, and you will be seeing you know, how many new airports are being built today.

Student: Almost all tier 2 cities.

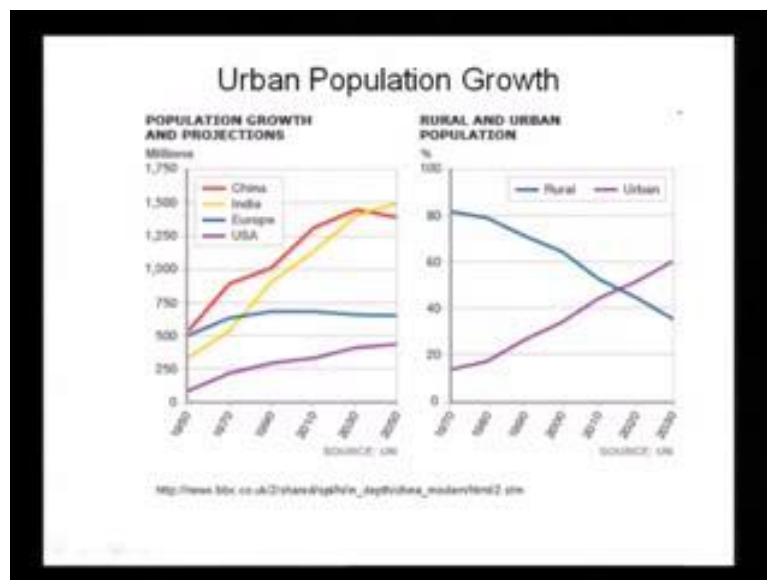
All tier 2 cities, you know even major cities, you know BIAL, Bombay International take DIAL just got completed very successfully you know one of the largest airports. Bombay international airport, Chennai is under construction, Hyderabad just got constructed, Bangalore was over, and now they are going for phase two. You are going to the tier 2 cities,

all over there are airports being constructed.

So, what use to be basically a runway and a very small airport building way, you came and pass through becoming a commercial center today. You take any of these things, you go back to the ports, a large amount of port development activities. We are all coastal nation, there was lot of opportunity in a ((Refer Time: 06:51)) neighbors, which are much smaller being able to capitalize on port trade much, much more than we are, because we do not have, so say a country like Singapore can have a capacity, has as much larger capacity for port activity than India for its size.

How do we even compete with that or you know, we have the potential to do so, and we really need development in this kind of regions. I go back to roads, the same story; whether it is national highways or rural roads without I mean you have seen how much different are road makes to an area. The minute you have transportation infrastructure the area develops, the minute they know and then you know the quality of life goes up; literacy goes up; everything else goes up. So, for national development, all this kind of infrastructure is very critical.

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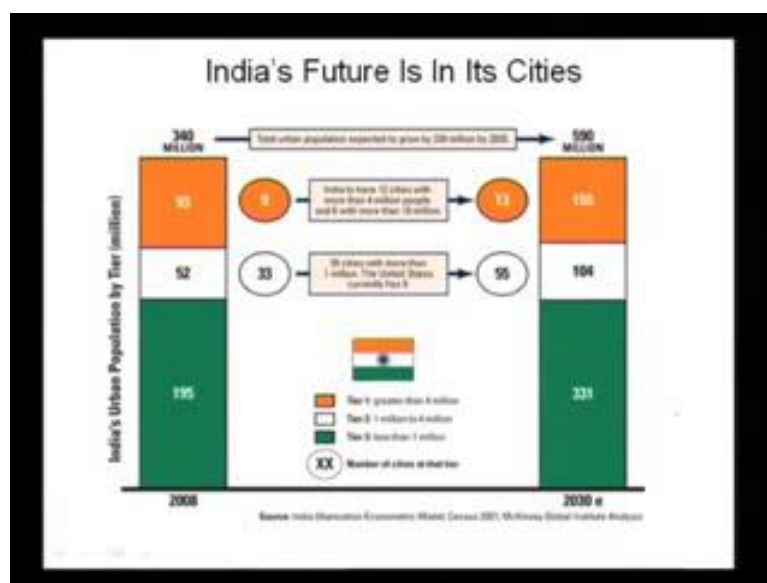
Let us continue, so we looked at general we have mostly transportation infrastructure, but if we look at urban population you can see here you can look at, so China is still the most populous country in the world, but somewhere people expect India to overtake China and we will be the largest population with the reasonably good pyramidal distribution. So, there is a lot we need to do to be able to capitalize on that.

And the other trend you see, if you look at the rural population versus the urban, as we go forward in time the rural population will drop, and the urban population is what is going to. People are going to move from rural to urban areas; these are trends which we see. Now, basically, what is the expectation out of this trend? So, you looking at 2020, 2030 all of you are in a peak of a career at that stage. You are going to have more urban population than rural population or a significantly larger urban population, what is an impact.

Student: Need for infrastructure

Need for infrastructure, all kinds of infrastructure.

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So, I can just, just reemphasizing this urban infrastructure part. So, here just, just look at some of these comparisons you know we have we have population goes up from you know goes to 590 and will have 13 cities with more than 4 million people out of which 6 will have more than 10 million people, will have 55 cities with more than 1 million the US only has 9 cities with more than 1 million will have 55.

And you can see, but again the trend is that urban population is going to increase, and this is totally infrastructure and national level you know dams, roads are one think urban infrastructure is another very, very big area of development.

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So, we need real estate, urban infrastructure and you are experienced in that today all kinds of infrastructure is being built from Chennai metro to you know whether IT buildings or commercial building or housing projects or water supply systems.

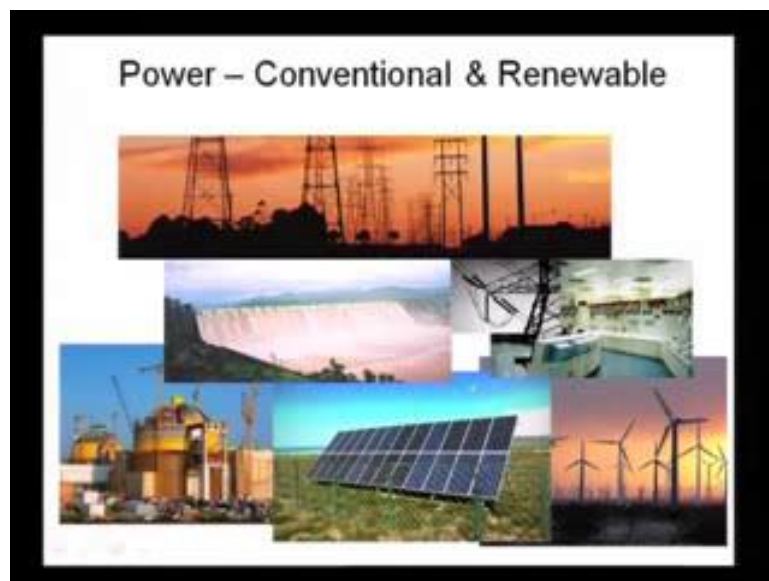
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But we cannot ignore rural infrastructure because still a lot of a population going to be in a rural area they I mean quality of life there is also very important, but the needs as slightly different you going to have sanitation projects, housing projects you know more, more rural housing, irrigation, rural roads all of these. So, all of this is going to I mean based on current projection in the next 2025 years this just as to sustain this level of growth as this level of infrastructure development has to sustain if a population is going to maintain or at least

continue this quality of life or improve the ideally we should improve a quality of life.

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Now, this is another big area we are facing you know the situation today we have facing, so much of power shortage and this is a very, very major area and which we need whether it is renewable energy and whether it is nuclear energy are whether it is a traditional you know thermal power plant we need power; otherwise we are not going to be able to fuel our industry we will we when have been just, so much of growth depends on power.

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Average Annual Sectorial Financial Outlays

All figures are in US\$ mn per annum

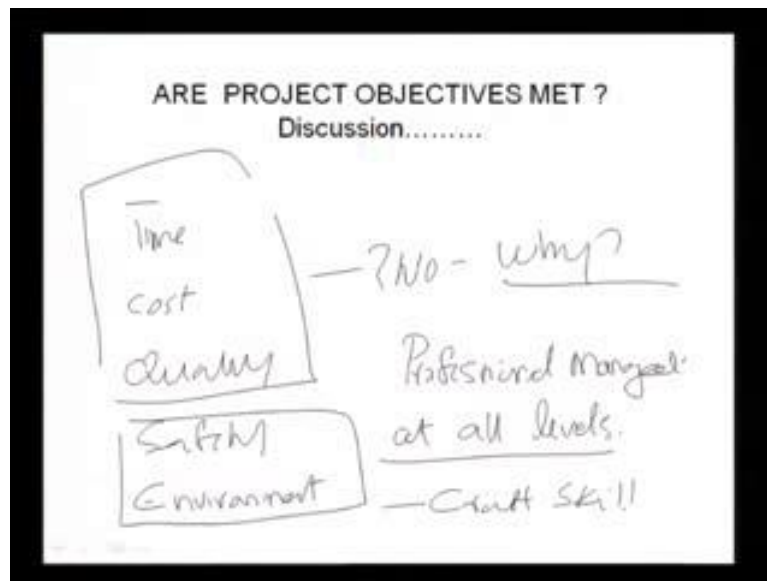
S No.	Department	2007-2012 11 th FYP	2012-2017 12 th FYP
1	Electricity	27,608	60,067
2	Renewable Energy	3,569	12,743
3	Roads and Bridges	18,125	38,776
4	Telecommunication	15,398	37,756
5	Railways	8,049	20,872
6	MRTS	1,667	4,966
7	Irrigation (incl. Watershed)	9,740	20,175
8	Water Supply and Sanitation	4,831	10,198
9	Ports (+ILW)	1,781	7,911
10	Airports	1,452	3,509
11	Oil and Gas pipeline	2,501	5,957
12	Storage	717	2,338
	Total	95,439	226,268

So, if you actually look at the five-year plan what we see here is the five-year plan that was over last year this was the outlay for what we are talking about. So, these are the sectors most these are directly construction sectors, and this is the planned outlays it is for the next five-year, so this huge amount of investment going into the construction sector. So, from the policy point of view from a planning commission point of view the pushing all this money into the construction set, what is the limitation, where is the bottleneck?.

Student: ((Refer Time: 12:13))

What resources we really do not have, so if you look at I mean we do not have construction industry bandwidth to be able to handle this many this much of money in this shorter time. The company as to grow you know and we able to so; that means, is a lot of opportunity in the construction industry you know to be able to I mean the government has decided that the this is what needs to be, and this is just the public sector to bring in the private sector now, it is an even larger I mean not even larger it is as significant kind of investment that are going on.

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So, when we look at this from the national perspective one is yes industries I mean construction companies or construction project delivery mechanism have to be a device to be able to spend all this money efficiently in this next few years one. Let us go back to some other questions we asked last time, or you have when we look at objectives, what are the objectives of our project quickly

Student: time, cost, quality, safety, environment

how many if these objectives are met on projects today?

Student: at least three ((Refer Time: 13:42))

Are they met?

Student: No, no ((Refer Time: 13:45)).

We have now, let say this is little more difficult to measure from now we know these. So, if you take an average project of our country is this satisfied or not satisfied, **Student:** not satisfied

not satisfied most projects over on time, over on cost quality is not it could be much, much better might be from a safety perspective with it is means structure safety might be okay, but the general quality of construction can be really it leaves a lot to be decided is we would protect the question is.

So, so we are saying are they met. No why are they not?

Student: Lack of proper management guidelines.

So, one, one I mean, so there would be many reasons. So, one place where we can kind of make a change is in what we would professional management, management and at all levels, we are not just talking about project manager level we are talking about that we know all levels of a project site you know right down to the foremen who is actually supervising the work write down to you know the other point with comes up this craft skill.

So, today if you look at whether it is a craftsman or a project management professional we find the level of training they have had, then they are not for the kind of scale of project where undertaking they are not really we do not have a people to handle, that's basically, where we are coming people we have is in that kind of ironic country like India we talked about population growing, exploding, but we still do not have a people.

So, that is that is the kind of an of the situation where are in and only where we can get out of the situation is people understanding what they need to do in terms of knowledge skill and experience and then being able to put to practice it properly. You take craftsmen; there is a lack of skilled craftsmen today. So; obviously, there is the lack of skilled craftsmen. The minute I go to the site and ask a Mason, who does not have the experience to do masonry the quality is not going to be as good. The engineer who inspects does not know how to ensure that the concrete quality is designed and poured in the right way.

So, they will again when you take out of formwork again there is going to be all kinds of problems like. So, at every level, we need more competent in our people, and that is really from an education perspective that is really, where one of the things which we really need to address and courses like this in some ways address that.