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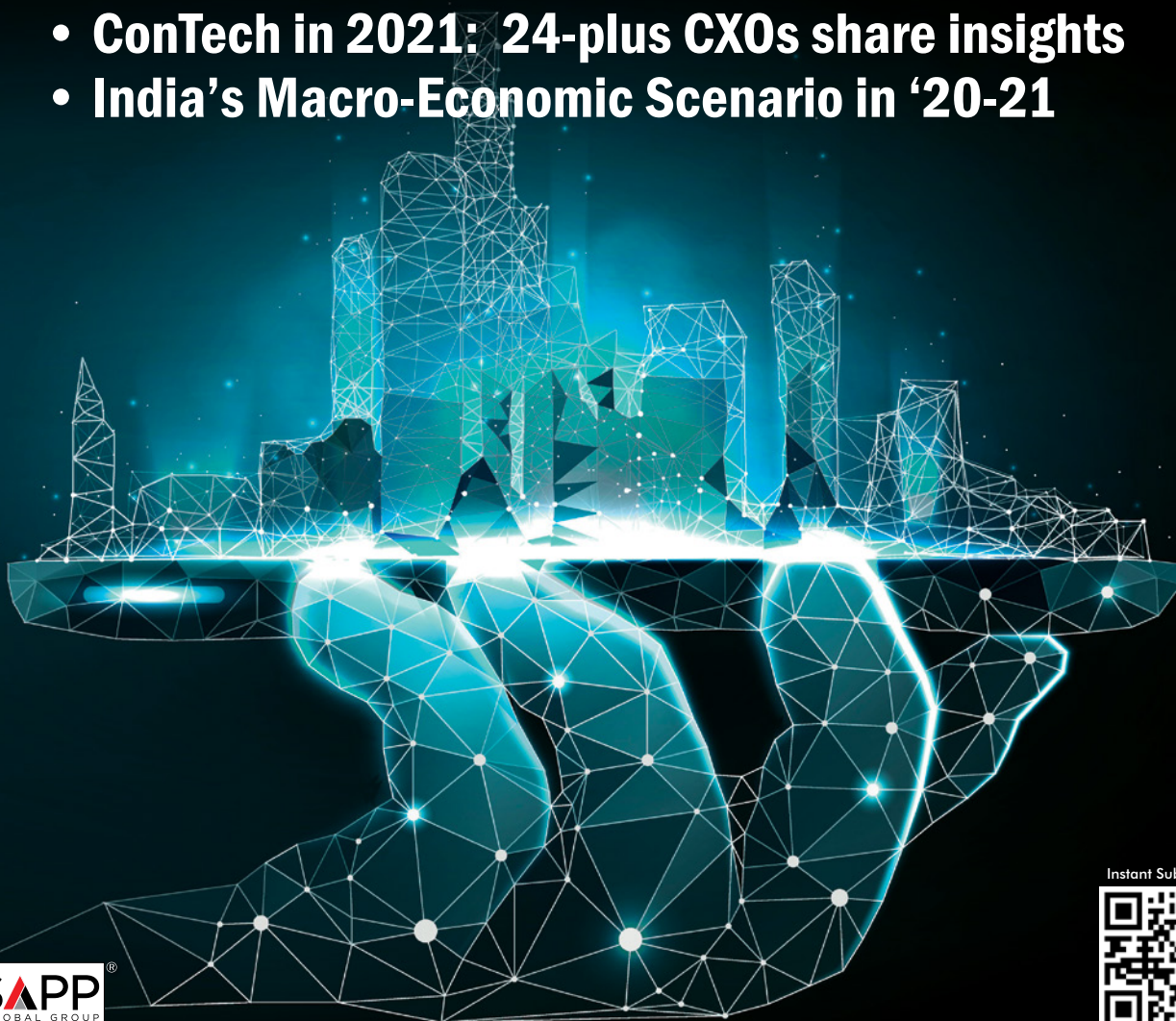


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INDIA'S FASTEST GROWING COMPANIES

- ConTech in 2021: 24-plus CXOs share insights
- India's Macro-Economic Scenario in '20-21



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The Top 250 International Contractors Cont...

RANK 2020	RANK 2019	FIRM	2019 REVENUE \$ MIL.		2019 NEW CONTRACTS \$ MIL.	GENERAL BUILDING	MANUFACTURING	POWER	WATER SUPPLY	SEWER / WASTE	INDUS. / PETROLEUM	TRANSPORTATION	HAZARDOUS WASTE	TELECOM
			INT'L	TOTAL										
101	111	SHANGHAI CONSTRUCTION GROUP CO. LTD., Shanghai, China	663.6	40,200.3	1,377.2	77	0	0	0	2	1	20	0	0
102	124	PER AARSLEFF HOLDING A/S, Viby J, Denmark†	621.2	1,991.3	654.4	1	45	4	0	15	8	27	0	0
103	113	BL HARBERT INTERNATIONAL, Birmingham, Ala., U.S.A.	618.2	974.6	887.8	84	0	0	0	0	0	0	0	0
104	110	CONTRACTING AND TRADING CO. [C.A.T.], Beirut, Lebanon†	617.0	618.0	794.0	1	0	0	0	0	82	16	0	0
105	154	BEIJING URBAN CONSTRUCTION GROUP CO. LTD., Beijing, China†	607.6	21,196.0	578.7	43	0	0	0	3	2	51	0	0
106	121	YUNNAN CONSTR. & INVEST. HOLDING GROUP CO., Kunming, China†	600.6	600.6	1,160.6	12	0	0	1	0	1	86	0	0
107	116	CHINA HENAN INT'L COOP. GROUP CO. LTD., Zhengzhou, Henan, China	593.3	593.3	487.4	1	0	0	8	3	0	70	0	0
108	123	THE ARAB CONTRACTORS CO. (OSMAN AHMED OSMAN), Cairo, Egypt†	589.0	2,186.0	370.0	15	0	3	20	32	0	30	0	0
109	128	NUROL CONSTRUCTION AND TRADING CO. INC., Istanbul, Turkey†	581.2	1,145.8	170.1	76	0	0	16	0	0	8	0	0
110	117	SINOPEC ZHONGYUAN PETROLEUM ENG'G LTD., Puyang, China†	573.5	1,801.8	476.9	0	0	0	0	0	100	0	0	0
111	101	CHINA ELECTRIC POWER EQPT. & TECHNOLOGY CO., Beijing, China†	572.3	577.4	30,894.0	0	0	100	0	0	0	0	0	0
112	112	GHELLA SPA, Rome, Italy†	557.0	734.0	617.0	0	0	21	0	24	0	48	0	0
113	134	BLACK & VEATCH, Overland Park, Kan., U.S.A.†	549.0	2,040.2	487.9	0	0	50	10	11	29	0	0	0
114	114	DRA GLOBAL LTD., Perth, Western Australia, Australia†	546.9	742.1	574.0	0	0	0	0	0	0	0	0	0
115	106	BAUER AG, Schrobenhausen, Bavaria, Germany†	542.2	965.1	679.8	29	3	18	9	3	11	23	0	4
116	131	ONUR TAAHHUT TASIMACILIK INSAAT TIC. VE SANAYI, Ankara, Turkey†	541.8	621.9	330.1	0	0	0	0	0	2	70	0	0
117	120	BEIJING CONSTRUCTION ENGINEERING GROUP CO., Beijing, China†	530.7	14,477.0	699.8	89	1	0	0	6	0	4	0	0
118	**	YUKSEL INSAAT CO. INC., Ankara, Turkey†	530.0	548.3	336.0	50	0	0	17	0	0	33	0	0
119	136	AFCONS INFRASTRUCTURE LTD., Mumbai, Maharashtra, India†	529.5	1,340.6	324.5	0	0	0	3	0	0	97	0	0
120	130	CHINA JIANGSU INT'L ECON. & TECH. COOP. GROUP, Nanjing, China†	523.9	1,884.3	787.2	71	0	0	2	0	1	27	0	0
121	103	POSCO ENGINEERING & CONSTRUCTION, Pohang-si, South Korea†	523.5	6,302.3	238.0	14	1	8	2	1	66	8	0	0
122	133	JIANGSU NANTONG SANJIAN CONSTR. GROUP CO., Haimen, China†	517.7	14,975.9	194.3	100	0	0	0	0	0	0	0	0
123	83	DONGFANG ELECTRIC CORP., Chengdu, Sichuan, China†	513.0	4,935.9	1,807.8	0	0	98	0	0	0	2	0	0
124	127	GULERMAK, Ankara, Turkey†	509.2	699.1	138.8	0	0	0	0	0	0	100	0	0
125	137	STO BUILDING GROUP INC., New York, N.Y., U.S.A.†	503.7	7,888.0	573.0	71	0	0	0	0	17	1	0	11
126	166	ANHUI SOGECO FOR. ECON. CONSTR. (GROUP) CO., Hefei, China†	499.0	529.5	209.5	54	0	6	3	0	0	4	0	0
127	100	CHINA NATIONAL AERO-TECH. INT'L ENG'G CORP., Beijing, China†	498.2	691.9	171.4	43	0	0	0	9	0	48	0	0
128	140	GRUPO EMPRESARIAL SAN JOSE SA, Tres Cantos, Madrid, Spain†	489.1	1,073.1	340.7	88	1	0	2	0	0	10	0	0
129	156	ESTA INSAAT SANAYI LOJISTIK VE DIS TIC. ANONIM, Istanbul, Turkey	485.0	487.9	943.0	64	23	0	0	0	1	6	0	0
130	125	SICIM SPA, Busseto (PR), Italy†	484.0	489.6	560.0	0	0	0	0	0	100	0	0	0
131	91	RIZZANI DE ECCHER SPA, Pozzuolo del Friuli - Udine, Italy†	482.1	640.3	775.0	38	0	0	0	0	3	45	0	0
132	165	GRAHAM, Calgary, Alberta, Canada†	474.0	1,953.4	418.9	70	0	0	1	0	0	29	0	0
133	86	CHINA NONFERROUS METAL IND. FOR. ENG'G & CONST., Beijing, China	473.2	473.5	1,209.9	0	0	0	9	0	91	0	0	0
134	129	ALBERICI-FLINTCO, St. Louis, Mo., U.S.A.†	466.5	2,573.5	393.2	3	0	0	5	5	86	0	0	0
135	141	SSANGYONG ENG'G & CONSTRUCTION CO., Seoul, South Korea†	464.0	1,259.0	343.0	83	0	0	0	0	0	17	0	0
136	115	CGCOC GROUP CO. LTD., Beijing, China†	456.7	488.2	960.1	6	0	5	29	1	0	58	0	0
137	148	DEKINSAN GRUP INSAAT AS, Ankara, Turkey	430.2	435.4	75.1	100	0	0	0	0	0	0	0	0
138	132	CHINA WU YI CO. LTD., Fuzhou, Fujian, China†	423.0	3,278.4	308.7	26	0	3	1	63	7	0	0	0
139	**	SHANDONG HI-SPEED GROUP CO. LTD., Jinan, Shandong, China†	420.1	1,870.3	1,372.6	71	0	0	0	1	0	28	0	0
140	143	CHINA TRIUMPH INTERNATIONAL ENGINEERING CO., Shanghai, China†	405.6	1,744.3	636.6	0	0	29	0	0	71	0	0	0
141	161	CADDELL CONSTRUCTION CO. (DE) LLC, Montgomery, Ala., U.S.A.	403.2	625.8	NA	100	0	0	0	0	0	0	0	0
142	147	KUZU GROUP, Istanbul, Turkey†	400.0	475.0	300.0	75	0	0	0	25	0	0	0	0
143	158	JIANGXI WATER & HYDRO. CONSTRUCTION CO. LTD., Nanchang, China	385.8	597.2	147.9	25	0	18	36	1	0	19	0	0
144	144	ZHONGDING INTERNATIONAL ENGINEERING CO., Nanchang, China†	385.2	385.2	169.3	81	0	0	0	4	0	14	0	0
145	107	SINOSTEEL EQUIPMENT & ENGINEERING CO. LTD., Beijing, China	379.6	1,733.0	1,007.1	0	0	0	0	0	100	0	0	0
146	138	YANJIAN GROUP CO. LTD., Yantai, Shandong, China†	377.3	2,323.1	298.5	82	0	14	1	0	3	0	0	0
147	173	TUTOR PERINI CORP., Sylmar, Calif., U.S.A.†	377.2	5,548.6	451.1	39	0	0	0	0	0	61	0	0
148	145	CHINA NATIONAL COMP. PLANT IMP. & EXP. GROUP, Beijing, China†	375.4	375.4	365.0	65	12	5	0	4	10	0	3	0
149	157	TAISEI CORP., Tokyo, Japan†	375.0	16,092.0	1,582.0	23	1	1	0	0	0	28	0	0
150	**	LONG JIAN ROAD & BRIDGE CO. LTD., Harbin, Heilongjiang, China	364.9	1,974.9	1,083.2	0	0	0	0	0	0	100	0	0

The Top 250 Global Contractors Cont...

RANK 2020	RANK 2019	FIRM	2019 REVENUE \$ MIL.		2019 NEW CONTRACTS \$ MIL.	GENERAL BUILDING	MANUFACTURING	POWER	WATER SUPPLY	SEWER / WASTE	INDUS. / PETROLEUM	TRANSPORTATION	HAZARDOUS WASTE	TELECOM
			TOTAL	INT'L										
151	160	DEVCON CONSTRUCTION INC., Milpitas, Calif., U.S.A.	1,910.0	0.0	2,000.0	100	0	0	0	0	0	0	0	0
152	142	BARTON MALOW HOLDINGS LLC, Southfield, Mich., U.S.A.	1,900.0	29.9	1,699.6	70	11	3	0	1	15	0	0	0
153	140	CHINA JIANGSU INT'L ECON. & TECH. COOP. GROUP, Nanjing, China	1,884.3	523.9	2,236.5	81	0	0	0	0	0	7	0	0
154	**	SHANDONG HI-SPEED GROUP CO. LTD., Jinan, Shandong, China	1,870.3	420.1	2,647.8	21	0	0	0	0	0	79	0	0
155	145	TEKFEN CONSTRUCTION AND INSTALLATION CO. INC., Istanbul, Turkey	1,858.0	1,464.0	506.0	5	0	0	0	0	48	47	0	0
156	**	S&B ENGINEERS AND CONSTRUCTORS LTD., Houston, Texas, U.S.A.	1,851.2	0.0	1,600.0	0	0	0	0	0	100	0	0	0
157	129	VAN OORD N.V., Rotterdam, Netherlands	1,841.1	1,409.6	NA	0	0	34	0	0	15	51	0	0
158	174	WALBRIDGE, Detroit, Mich., U.S.A.	1,810.9	143.7	1,645.8	21	53	5	0	0	4	3	0	14
159	**	STRIKE, The Woodlands, Texas, U.S.A.	1,803.0	0.0	1,700.0	0	0	0	0	0	97	0	0	3
160	161	SINOPEC ZHONGYUAN PETROLEUM ENG'G LTD., Puyang, Henan, China	1,801.8	573.5	1,484.3	0	0	0	0	0	100	0	0	0
161	175	CONSIGLI CONSTRUCTION CO. INC., Milford, Mass., U.S.A.	1,777.0	0.0	1,439.0	100	0	0	0	0	0	0	0	0
162	162	POMERLEAU INC., Saint-Georges, Quebec, Canada	1,765.0	30.0	3,622.0	61	0	19	5	0	0	15	0	0
163	163	CHINA TRIUMPH INTERNATIONAL ENGINEERING CO., Shanghai, China	1,744.3	405.6	2,430.8	0	0	31	0	0	69	0	0	0
164	139	CTCI CORP., Taipei, Taiwan	1,736.8	1,203.3	1,348.8	3	3	23	0	11	52	6	1	0
165	170	SINOSTEEL EQUIPMENT & ENGINEERING CO. LTD., Beijing, China	1,733.0	379.6	2,634.8	0	0	0	0	0	100	0	0	0
166	168	SUNDT CONSTRUCTION INC., Tempe, Ariz., U.S.A.	1,730.9	0.0	1,611.2	50	9	2	0	24	3	13	0	0
167	130	KOLIN INSAAT TURIZM SANAYI VE TICARET AS, Ankara, Turkey	1,702.8	751.2	1,761.0	2	0	4	1	0	1	80	0	4
168	223	WORLEY LTD., North Sydney, NSW, Australia	1,702.0	1,698.0	4,827.9	0	0	0	0	0	99	0	0	1
169	155	SHANDONG ZIJIAN CONSTRUCTION GROUP CO., Zibo, Shandong, China	1,673.3	195.0	1,225.4	19	7	4	2	50	12	1	1	4
170	208	GRAY CONSTRUCTION, Lexington, Ky., U.S.A.	1,672.7	153.2	1,672.7	26	27	0	0	0	42	0	0	6
171	159	ABENGOA, Seville, Spain	1,671.0	1,520.0	1,240.0	6	0	70	20	1	0	3	0	0
172	181	THE KOKOSING GROUP OF COS., Westerville, Ohio, U.S.A.	1,605.5	0.0	1,827.2	17	0	6	4	12	8	48	0	0
173	152	NORINCO INTERNATIONAL COOPERATION LTD., Beijing, China	1,603.3	887.0	2,243.6	15	3	15	0	0	37	4	0	0
174	191	CHINA ZHONGYUAN ENGINEERING CORP., Beijing, China	1,525.5	1,525.5	NA	0	0	100	0	0	0	0	0	0
175	166	SHAWMUT DESIGN AND CONSTRUCTION, Boston, Mass., U.S.A.	1,483.6	0.0	1,092.0	100	0	0	0	0	0	0	0	0
176	185	INFRASTRUCTURE AND ENERGY ALTS, INC., Indianapolis, Ind., U.S.A.	1,459.8	0.0	1,676.2	1	0	66	0	0	2	29	0	0
177	158	IMPRESA PIZZAROTTI & C. SPA, Parma, Italy	1,454.5	948.5	657.1	52	0	0	0	5	0	43	0	0
178	203	SHANGDONG DEJIAN GROUP CO. LTD., Dezhou, Shandong, China	1,430.7	190.5	1,521.1	88	6	3	1	1	0	1	0	1
179	138	TATA PROJECTS LTD., Secunderabad, Telangana, India	1,423.0	68.7	1,805.0	23	0	27	7	0	8	31	0	3
180	193	MATRIX SERVICE CO., Tulsa, Okla., U.S.A.	1,414.4	80.6	NA	0	0	12	0	0	88	0	0	0
181	196	DAVID E. HARVEY BUILDERS INC., Houston, Texas, U.S.A.	1,397.0	0.0	1,030.0	100	0	0	0	0	0	0	0	0
182	180	YAPI MERKEZI INSAAT VE SANAYI AS, Istanbul, Turkey	1,390.1	1,176.0	55.1	2	0	0	0	4	0	94	0	0
183	190	J.T. MAGEN & CO. INC., New York, N.Y., U.S.A.	1,379.3	0.0	1,088.0	92	0	0	0	0	0	0	0	8
184	182	AFCONS INFRASTRUCTURE LTD., Mumbai, Maharashtra, India	1,340.6	529.5	854.9	0	0	1	7	0	12	77	0	0
185	214	CLUNE CONSTRUCTION, Chicago, Ill., U.S.A.	1,327.0	0.0	1,535.0	81	0	0	0	0	0	0	0	19
186	207	OKLAND CORP., Salt Lake City, Utah, U.S.A.	1,319.8	0.0	1,263.0	86	2	0	0	0	0	9	0	3
187	212	THE MCSHANE COS., Rosemont, Ill., U.S.A.	1,302.7	0.0	1,170.3	100	0	0	0	0	0	0	0	0
188	197	FORTIS CONSTRUCTION INC., Portland, Ore., U.S.A.	1,295.6	120.4	941.1	21	0	0	0	0	0	0	0	79
189	189	CROSSLAND CONSTRUCTION CO. INC., Columbus, Kan., U.S.A.	1,284.0	0.0	1,093.0	81	6	0	4	4	0	6	0	0
190	167	APTIM, Baton Rouge, La., U.S.A.	1,275.7	282.7	1,168.4	13	0	8	0	3	34	4	28	0
191	186	PERFORMANCE CONTRACTORS INC., Baton Rouge, La., U.S.A.	1,271.0	0.0	1,190.0	0	4	3	0	0	92	0	0	0
192	238	THE CONLAN CO., Marietta, Ga., U.S.A.	1,263.6	0.0	1,008.0	100	0	0	0	0	0	0	0	0
193	246	ALSTON CONSTRUCTION, Atlanta, Ga., U.S.A.	1,262.0	0.0	1,219.0	100	0	0	0	0	0	0	0	0
194	192	SSANGYONG ENGINEERING & CONSTRUCTION CO., Seoul, South Korea	1,259.0	464.0	1,138.0	77	0	1	2	1	2	18	0	0
195	250	ADOLFSON & PETERSON CONSTRUCTION, Minneapolis, Minn., U.S.A.	1,258.0	0.0	2,087.0	97	0	0	0	0	3	0	0	0
196	232	MOSS, Fort Lauderdale, Fla., U.S.A.	1,256.6	0.1	1,354.2	69	0	23	0	0	0	9	0	0
197	183	PEPPER CONSTRUCTION, Chicago, Ill., U.S.A.	1,253.8	0.0	2,116.0	95	2	0	0	0	0	0	1	2
198	221	AMES CONSTRUCTION INC., Burnsville, Minn., U.S.A.	1,249.0	0.0	869.0	3	0	3	4	2	0	71	0	2
199	198	BI GROUP, Nur-Sultan (Astana), Kazakhstan	1,229.0	40.0	1,680.0	71	0	10	1	1	0	17	0	0
200	**	ATLAS GROUP, Katy, Texas, U.S.A.	1,227.0	1,189.0	614.3	100	0	0	0	0	0	0	0	0



CONSTRUCTION WORLD'S FASTEST GROWING CONSTRUCTION COMPANIES IN INDIA

A major issue faced by the Indian Government is job creation. And with the construction industry in India being the second largest employer after agriculture, it is critical to the country's economic stability. It is a known fact that India is an infrastructure-deficit country; hence, there is immense potential for the construction sector to grow. With an

industry size of Rs 10.5 trillion, it accounts for around 8 per cent of India's GDP and employs close to 5.75 crore people. Government construction projects provide a huge impetus to the industry. Initiatives, such as the creation of smart cities, world-class highways, shipping infrastructure, railway expansion, housing and urban development, have attracted large

INDIA'S FASTEST GROWING

Rank		Company	Revenue (₹ crore)						
2019	2020		2020	2019	2018	2017	2016	2015	
Construction companies having Turnover more than ₹ 5000 crore									
1	1	GR Infraprojects	6027.76	4950.18	3108.13	3182.04	1882.19	876.54	
2	2	Afcons Infrastructure	10130.00	8875.68	6687.73	6406.00	4474.00	4070.20	
3	3	Dilip Buildcon	8983.82	9118.22	7745.88	5331.40	4316.69	2761.95	
1	4	Tata Projects	10514.20	13229.78	9223.21	6086.00	4257.24	3364.45	
3	5	NCC	8218.80	12079.76	7559.33	7892.07	8325.16	9497.08	
4	6	Larsen & Toubro	82383.65	86987.86	74462.55	65723.86	59779.61	57017.41	
10	7	NBCC	5210.34	7244.76	5905.01	6279.39	5827.10	4360.97	
Inadequate Data									
		Navayuga Engineering Company Limited	NA	5590.36	5260.96	4581.76	3468.36	3200.01	
		Megha Engineering & Infrastructures Limited	NA	19502.40	18317.50	13008.78	8756.77	6491.07	

Megha Engineering is the second largest company in India after L&T

investments through FDI, private players and government budgets. As the Government plans to more than double investment in the infrastructure sector to about Rs 100 lakh crore over the next five years, construction companies are likely to witness significant opportunities, with key segments being highways, railways, ports, urban infrastructure, metros and airports.

While the long-term prospects look promising, there are various factors that are seen as roadblocks in the near to medium term. This year, the infrastructure and construction sectors faced tremendous headwinds from the COVID-19 pandemic. The lockdown imposed across the country led to low consumer sentiment and loss of income as well as the diversion of government funds towards management of the pandemic. Investment in capital projects drives the demand side of the construction sector; thus, the impact of COVID-19 on gross value added (GVA) and employment could be significant in the near to long term.

As for infrastructure and construction, over the years the Government has made incessant efforts to boost the growth in the roads sector, for which it has identified and addressed the bottlenecks through appropriate policy interventions. The National Infrastructure Pipeline (NIP) Task Force has submitted its final report to the Finance Ministry in April 2020, which envisages doubling the infrastructure spend

from around 5 per cent of nominal GDP to 10 per cent over FY21-23. Overall, NIP allocation has increased by 9.1 per cent and allocation to roads by 3.8 per cent; for energy, it has gone up by 9.8 per cent. Other noteworthy sectors witnessing an increase are urban infra (17.7 per cent) and irrigation (16.2 per cent).

This apart, project financing is a tough task, especially when the majority of firms find their balance sheets already leveraged. Monetisation of non-core assets has also taken place and the equity route has been difficult on account of volatility. With regard to other sources, infrastructure financing is currently dominated by banks, with the outstanding credit to infrastructure as a percentage of gross non-food credit at 12 per cent in FY19. Power and roads have the largest exposure at around 72 per cent of the outstanding infrastructure credit, as in FY19. Thus, it is important to get higher fund allocation from pension or insurance funds for the sector. In simple terms, regulation needs to change to enable flow of funds.

As for the future prospects, while in the near term COVID-19 headwinds limit a large uptick in central and state infra spends, the mid to long-term drivers remain intact. India has always been capital-starved for infrastructure capacity creation—NIP lays out a roadmap for reforms and to secure loan term financing. Despite the medium-term setbacks, the long-term growth story remains intact.

CONSTRUCTION COMPANIES (LARGE CATEGORY)

	Profits (₹crore)						Company	Rank	
	2020	2019	2018	2017	2016	2015		2020	2019
	Construction companies having Turnover more than ₹ 5000 crore								
	688.77	595.71	392.73	583.08	101.15	30.49	GR Infraprojects	1	1
	247.00	234.44	164.12	153.00	78.00	53.18	Afcons Infrastructure	2	2
	424.98	764.94	620.30	357.86	229.48	81.18	Dilip Buildcon	3	3
	102.99	239.90	186.96	135.47	61.85	93.70	Tata Projects	4	1
	382.04	563.91	286.80	225.50	222.85	61.48	NCC	5	3
	6679.21	6677.70	5387.30	5453.74	5311.46	5056.18	Larsen & Toubro	6	4
	79.87	384.11	333.61	351.10	308.80	277.30	NBCC	7	10
	Inadequate Data								
	NA	128.59	399.35	227.93	177.22	74.36	Navayuga Engineering Company Limited		
	NA	2771.113	2934.96	1816.78	1152.02	741.24	Megha Engineering & Infrastructures Limited		

CONSTRUCTION COMPANIES

CW profiles the top companies in this category...

LARGEST AND MOST PROFITABLE CONSTRUCTION CONTRACTOR



LARSEN & TOUBRO (L&T)

Tough times separate the men from the boys. Over the years, even when the whole infrastructure sector has been struggling, L&T has shown consistency in performance, despite all the challenges. Little wonder then, that it is called the 'poster boy' of Indian infrastructure. With its size and range of projects, execution capability and ability to ride challenging economic

cycles and emerge unscathed, witnessing many peaks and troughs over the years, the company has paved its own path to glory. A strong, customer-focused approach and a constant quest for top-class quality have enabled L&T to attain and sustain leadership in its major lines of business for eight decades.

With its proven capability of execution and track record, L&T has witnessed strong growth in FY20 as well. The total order book as on March 31, 2020, stands at Rs 3,093 billion (Rs 2,908 billion in FY19) on account of a Rs 1,864 billion order inflow (up 9 per cent from FY19). Promisingly, in FY20, Rs 750 billion (Rs 617 billion in FY19) makes up the international order book; the remaining Rs 2,289 billion is domestic. Financially, the company posted a topline of Rs 1,454.52 billion in FY20 as against Rs 1,352.20 billion in FY19. With sustained margins, PAT stood at Rs 108.22 billion as against Rs 102.37 billion posted in FY19.



FASTEST GROWING CONSTRUCTION COMPANIES – LARGE CATEGORY



GR INFRAPROJECTS

G R Infraprojects is a leading engineering and construction company with wide experience in the design and construction of roads and highways. It possesses core competencies in the segment with integrated operations, right from manufacturing of materials and road construction to operation and maintenance. The company has the capability to carry out projects under both

the BOT and HAM models. With a presence across 13 states in India and manpower of over 11,000, it owns over 4,900 construction equipment and vehicles, including a fleet of over 60 tankers for transportation of

bitumen and diesel. To maintain its capability to undertake large projects, it seeks to purchase plants and equipment built with the latest technologies and knowhow. Going ahead, the focus of the company will be on EPC projects, which are its strength and where it has proved its expertise across large and complex projects. The management is also enthused by the opportunities in the HAM segment, an asset-light model with a lower risk element compared to BOT toll projects that draws upon its EPC expertise at the same time. Further, G R Infraprojects is looking to diversify into new verticals, like optical-fibre laying, railways, water-related infrastructure and sewerage. In FY19, the company had an order book of Rs 19,200 crore.



AFCONS INFRASTRUCTURE

Part of the Shapoorji Pallonji Group, Afcons Infrastructure is the second largest engineering and construction group in India. With its extensive experience and execution capabilities, it has managed to show consistent growth over the years. One of the fastest growing infrastructure companies, it has a \$ 300 million strategic equipment fleet and different units, like Marine & Industrial, Surface Transport, Urban Infrastructure, Oil & Gas and Hydro & Underground. Afcons has projects in over 22 countries—globally, it is ranked ninth in marine and port facilities and 13th in the bridge sector. According to the Engineering News – Records (ENR) survey, it ranks among the 150 top international global contractors. The growth of the company has been well-diversified and balanced across different segments and geographies, with no overdependence on any one sector or geography. Financially, consolidated revenues stood at Rs 10,130.69 crore in FY20 as against Rs 8,875.68 crore in FY19. On the back of higher provisioning for taxation, PAT was Rs 245.59 crore compared to Rs 240.10 crore in FY19. As on March 31, 2020, the company's order book stood at Rs 29,156 crore, including L1 orders of Rs 926 crore.



DILIP BUILDCON LTD (DBL)

When it comes to infrastructure players in the roads segment in India, DBL ranks among the top. It is one of the fastest growing, vertically integrated and innovation-focused EPC contractors in India in the segment. While other infrastructure players lease out construction fleets, DBL owns its large fleet of construction equipment and vehicles, helping it emerge as the largest road EPC player and earning it the recognition of being one of the best project executors in the country. Having successfully completed almost 90 per cent of its projects before time, it has managed to garner a sizable bonus amount in preceding years. Apart from roads, the company has also developed EPC capabilities in bridges and flyovers, irrigation, mining and urban development. Major factors distinguishing DBL from other infrastructure companies in India are its prudent bidding strategy and tight execution to complete projects before schedule. Other keys to its consistent growth are an integrated business model through in-house design, engineering and construction, no outsourcing or subcontracting of contracts, careful selection, and a geographical cluster of projects. Not surprisingly, the company has a strong order book of Rs 19,800 crore as in March 2020, offering good revenue visibility. In 4QFY20, working capital days declined to 90 from 107 in 3QFY20. The company's net debt for FY20 stood at Rs 2,930 crore compared to Rs 3390 crore in FY19; its net debt-to-equity ratio has come down from 1.06x to 0.81x during the same period.

Shrinking the concept-execution gap

Ingenuity and a commitment to adapt have helped Afcons enter new markets with expertise in new and emerging technologies, writes GIRIDHAR RAJAGOPALAN.

India is gearing up to flaunt some of the most daring and complex engineering projects that few countries have ever attempted. Very soon, the country will boast engineering marvels with superlatives such as 'the highest,' 'the longest,' 'the deepest,' 'the biggest,' and so on. And while most of these manmade wonders have been envisaged to solve a problem or make life easier, their sheer dimension, complex construction methodology and mind-boggling innovations will make us gasp in awe.

By completing the world's longest motorable tunnel 3,000 m above sea level (in a JV with Strabag) in Himachal Pradesh, becoming the first Indian company to install an offshore process platform using float-over technology on time, giving India its first underwater metro facility in Kolkata, completing one of India's largest multilevel interchange

metro stations in Chennai, constructing India's deepest metro station in Kolkata, and constructing the world's highest single-arch railway bridge in Jammu & Kashmir, Afcons has made innovation a cornerstone of all its projects. As the gap between concept and execution keeps shrinking, Afcons is creating new benchmarks with complex and remarkable milestones year after year.

Over the years, the Shapoorji Pallonji Group company has successfully harnessed its rich repository of knowledge and experience in project construction and management to create unique technological innovations. With an approximately \$ 350-million-strong equipment base and custom-built machines, Afcons is capable of adapting to any environment and take on any engineering project anywhere globally.



Giridhar Rajagopalan,
Executive Director (Technical), Afcons

Afcons has workshops in New Delhi and Nagpur exclusively dedicated to maintenance and innovation and we have always adopted a holistic approach towards creating sustainable infrastructure.



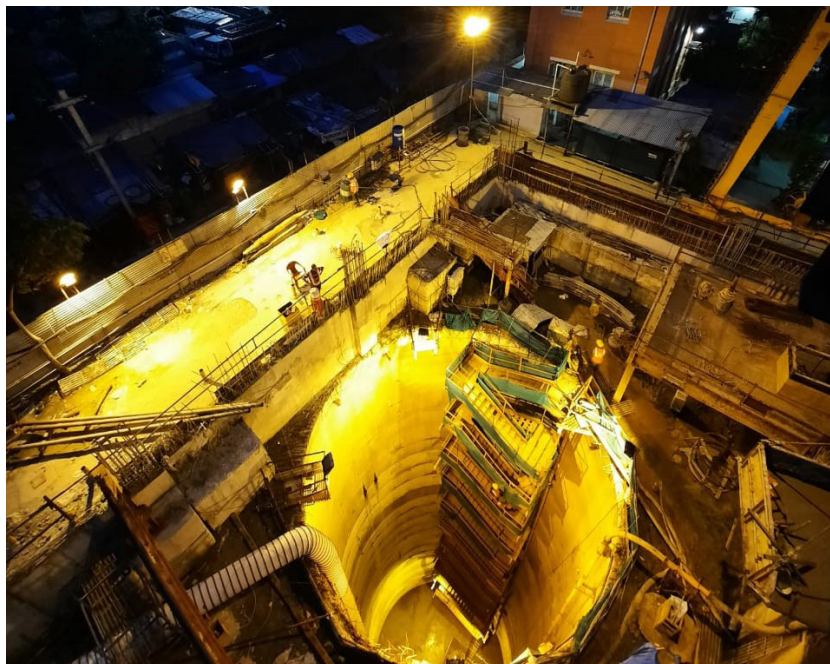
Our vast expertise allows us to select appropriate construction methodology and equipment to reduce overall construction time and thereby reduce the impact and disruption caused to community. We adopt 'Lean' construction practices to minimise wastage of materials and utilisation of material using the 3R approach (reduce-reuse-recycle). This provides the added benefit of reducing the stress on the project team and gives them several avenues to innovate and improve processes.

Resolve of steel

One of Afcons' recent milestones is the renovation and inauguration of the western flank of the historic Mahatma Gandhi (MG) Setu in Bihar. **Nitin Gadkari, Minister of Road Transport and Highways (MoRTH) & Micro, Small and Medium Enterprises**, inaugurated the bridge on July 31, 2020, calling it "an engineering marvel" and a "lifeline" for the masses. According to the minister, the technological research for the project will be a case study for other complex bridge projects in future. MG Setu is the first balanced cantilever bridge in India to be dismantled and converted into a simply supported bridge. The weakening concrete structure is being replaced with a steel deck superstructure. The project involves dismantling concrete to the tune of 76,500 cu m—something never attempted before in India. Most important, Afcons fabricated and erected 33,000 mt of steel truss members for the western flank in just 16 months with a peak production of 5,500 mt. Afcons is presently working on the eastern flank of the bridge.

World's highest

The Chenab Railway Bridge, which will be the world's highest single-arch railway bridge and 35 m taller than the Eiffel Tower upon completion, is a unique exemplar of



Kolkata Metro Ventilation Shaft: Afcons has constructed India's deepest Ventilation Shaft here.

modern and extreme engineering. The arch erection is a critical activity owing to its intricate design and geometry. Construction of the bridge requires 30,3349 mt of steel, 8741.15 mt of reinforced steel, 71,019 cu m of concrete and 10,10,756 cu m of excavation.

The main span of the bridge is a 469-m steel arch. In a first worldwide, incremental launching has been done on a transition curve as the deck is partly straight, partly on a circular curve, and partly on a transition curve. For the erection of the arch, the world's tallest cable crane has been commissioned that can handle loads up to 34 mt on a single hook. A lot of sophisticated equipment—such as CNC cutting machines, flux core arc welding equipment mounted on trolleys and an ultrasonic testing machine for examining welds for internal defects—is being deployed. A climbing crane has been developed indigenously for the erection of pylons of cable crane. Also, special design considerations have been

made, including handling blast loads, and design for fatigue has been done for the first time in the country.

Metro technology

Over the years, Afcons has established itself as a leader in the metro segment in India using cutting-edge technology. While constructing India's first twin underwater tunnels under river Hooghly, the team created a pathbreaking design to prevent the TBM from encountering difficulty in crossing the diaphragm wall. Attempted for the first time in India, a 'soft eye' of Styrofoam was designed replacing M-40 concrete, which worked extremely well. Also, a team of highly experienced tunnel crew was deployed for underwater boring. The TBMs were designed to shut down like a submarine in the event of any water ingress.

At Ahmedabad Metro, a high-pressure centre flushing system was introduced through the rotary coupling of the TBM to keep the



Tema-Mpakadan Railway Project: Afcons' first-ever EPC railway project and the largest in Ghana.

centre of the mixed face cutter head clean. This reduced up to 12 hyperbaric cutter head interventions, easing the process and saving cost. Also, an automatic fire detection and suppression system was introduced to avoid fires in the TBM cutter head drive motor.

In a methodology adopted for the first time in India, Afcons bucked the trend to build a diaphragm wall after completing underground tunnelling for Kankaria Station in Ahmedabad. Non-availability of land during the critical stage of construction necessitated this innovation, wherein two EPB TBMs were set in motion from Apparel Park, 575 m away from the station itself. This unique innovation saved time and allowed optimum use of equipment, which would have idled away if the standard procedure was followed. Afcons teams were able to create diaphragm walls for all stations of the Chennai Metro and Ahmedabad Metro without any breakage by using TBMs with mixed face cutter heads.

At Chennai Metro, a hydromill was used to construct the diaphragm walls for the first time in India. Also, reverse circulation drilling (RCD)

was attempted on land with efficient management of water circulation for the first time in the project. At Nagpur Metro, two double-decker launching girders were designed and fabricated in house, within three months, saving 1.5 days for every span of the project. At the Shaheed Govari Flyover located in the heart of Nagpur, the viaduct crossed a sharp curve of 173.15 m radius. The superstructure consisted of four steel composite girders weighing 230 mt. Erection of girders weighing 50 mt was done in two stages via tandem lifting using three high-capacity cranes and support of the Govari flyover deck. The priority stretch from Zero-Mile Station to Sitabuldi Station was completed in just three months.

Sleeper plant

The Tema-Mpakadan railway project in Ghana is Afcons's maiden EPC railway project. It is also the largest railway project in the West African country. Afcons built a sleeper plant using the long line method for the first time with the capacity to produce 720 sleepers per day, within a span of just three months.

In-house digitisation

Afcons teams have collaborated extensively to design mobile apps that ensure optimum utilisation of its equipment fleet. The first such app—MINI, or Mechanical Intellectual Interface—is a one-stop-shop for data on all Afcons-owned equipment. Dristee is a remote monitoring system app that provides information on the performance of each equipment based on live data such as fuel consumption, production, working hours, engine performance and hydraulic performance, monitored real time. Qxl App is a customised quality management app that encompasses pre and post-pour checklists, recording real-time observations and non-conformities, and tracking wastage of major construction material (concrete and bitumen).

Innovation culture

Indeed, Afcons has made innovation an integral part of its strategy. Globally, it is the only infrastructure company to win the Most Innovative Knowledge Enterprise (MIKE) twice in a row. Earlier, the company won the Most Admired Knowledge Enterprise (MAKE) for two consecutive years. Afcons remains committed to uphold its innovation culture and use technology intelligently for the benefit of society globally. **| CW |**

ABOUT THE AUTHOR:

Giridhar Rajagopalan, Executive Director (Technical), Afcons, has a rich experience of 40 years with companies like Afcons, Peninsula Land Ltd (Ashok Piramal Group) and V Karma Capital (DLF) in leadership positions. At Afcons, he heads core service departments such as Design, Quality Excellence, Health, Safety & Environment, and Knowledge Services Group. He is part of the Core Methods and Engineering Group. Under his guidance, a comprehensive GTE training programme (CLIMB UP) and development of domain experts has been initiated. He is also a member of the Board of Institute of Lean Construction Excellence (ILCE).