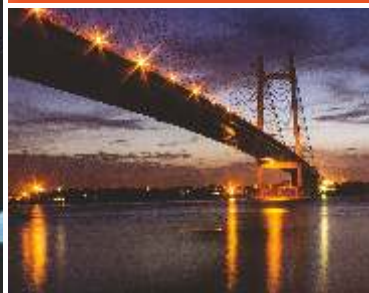




**Bajaj Electricals Ltd.**

*Inspiring Trust*



**HIGHMAST &  
STREET FURNITURE &**

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**Bajaj Electricals Ltd.**

*Inspiring Trust*



Bajaj Electricals Ltd. is a reputed and trusted Indian company, and a part of the US \$20 Billion “Bajaj Group”. Bajaj Electricals is in the business of - Consumer Products (Appliances, Fans, Lighting), Exports, Luminaires and EPC (Illumination, Transmission Towers and Power Distribution). The company also has a prominent presence in the hi-end range of appliances with brands like Platini and Morphy Richards in India. It has a branch office in Dubai, China and 20 branches in India, besides being supported by a chain of Dealers and Distributors across the country, and over 100 exclusive showrooms called ‘Bajaj World’.

EPC Segment of the company deals in Highmasts, Poles, Transmission Line Projects, Industrial and Rural Electrification. BEL is an undisputed leader and pioneer in the field of Highmast Lighting Systems and Lighting Poles in India. All activities of EPC BU are ISO:9001 Certified. The manufacturing unit is ISO:14001 & OSHAS 18001 certified.

BEL got in to the highmast Business since 1983 in collaboration with CU Lighting Ltd, UK. Initially complete systems were imported and subsequently technology was transferred to develop and manufacture high mast operating systems in India. BEL set up its In-house facilities in 2001 to design and develop the operating systems for various high mast applications.

## Facilities Offered at a Glance

### Why BEL Highmasts and Poles are Preferred?

BEL are pioneers in the field of highmast lighting for the over 30 years, and has unmatched experience in illumination, structural, luminaires product design, development, manufacturing, project management and project execution.

### Salient Features

Over 40000 masts and 750000 street light poles across India and abroad.

Economical and optimum design of mast structure due to high tensile steel.

Quality operating systems premium, performance, economical and popular to cater to every budget.

Having all facilities like manufacturing of highmast, luminaires and in-house illumination, structural, luminaires product design cell.

Growing every year and consistently in the market for more than 30 years with network of 20 branches across the country with dedicated manager and engineers to reach our customers 24x7.

Plant with CNC controlled plasma sheet cutting, bending, fully automatic submerged arc welding for longitudinal joint and galvanization.

Zinc and high tensile steel purchased from manufacturer for guaranteed and consistent physical and chemical properties.

Wind tunnel testing for force co-efficient.

Structural calculations vetted through IIT-Bombay, Mumbai and Chennai, EIL, CPWD, PWD, NTPC, PGCIL, IRS, various other consultants and clients structural program validated by testing of full size mast at Jyoti and SERC.

Type tested winches (Consultant IIT - Bombay).

User friendly simple operating system with docking arrangement for carriage.

### Operating Systems for Every Budget

Looking in to the customer budget and on taking the feedback from various customers in order to give quality product we have designed and developed following operating systems.

Premium System | Performance System | Popular System | Economic System

### BEL has In-house Facilities for Illumination Design

BEL has a team of well qualified, informed and experienced illumination design engineers, to prepare the designs with the help of the best available software.

BEL illumination design engineers are equipped to offer optimum designs for all lighting applications like stadiums, traffic junctions, airports, sea ports, container yards, railway marshalling yards, etc. Several lighting projects conforming to Indian/International standards, have been designed and successfully executed.



Wind Tunnel Test (Wichita University, Kansas USA)



Type Test of Winches (Consultant-IIT Bombay)



### Civil/Structure Design

BEL has an in-house set up for structural and foundation design for the masts. Designs generally conform to ILE TR No.7 and IS 875 part 3, or other international standards specified by clients. Masts conforming to various terrains, wind zones and heights have been designed by BEL over these years for installations in India and abroad. BEL has designed, manufactured and installed masts of heights up to 72m and for special applications and structures for signages etc.

### Mechanical Design

BEL has in-house team of engineers with latest solid modeling software to design the complete raising/lowering system and special application products to cater to customer specific requirements.

### Electrical System Design

BEL has in-house team of engineers for design of outdoor and indoor distribution for plant electrification, outdoor illumination, industrial plant illumination projects to cater to the customer requirements. We have successfully executed many projects for the reputed customers in India.

### Manufacture, Quality Control, Raw Material and Others

BEL's manufacturing plant is one of the best in the world and is fully equipped with all state-of-the-art CNC controlled machineries for consistency and accurate fabrication.

With these facilities BEL is capable of manufacturing highmasts conforming to international standards and as per the requirement of the user.

High tensile steel and zinc is purchased from the manufacturers for guaranteed physical and chemical properties.

In-house mechanical and chemical testing facilities and trained QA engineers ensure quality of all inbound materials as well as items manufactured at plant.

Trained safety engineers ensure safety for the workmen in the factory and provide guidelines for the site execution. The plant is ISO 9001 and 14001 and OSHAS 18001 certified.

### Marketing, Sales and Service Set-up

BEL has 20 offices in India with dedicated managers and engineers cater to its clientele. Our engineers involve in the project to provide optimum illumination and structural designs at project stage and subsequently competitive prices, timely completion of the jobs and after sales service.

BEL has an export division in Mumbai and office in Dubai and China to cater to its international customers.



## Raising and Lowering Winch Lighting Masts

### Introduction

BEL has been supplying high quality masts for more than 30 years and offers best solution for external illumination requirements.

These masts will accommodate any lighting system and are also ideal for mounting CCTV cameras and RF equipments. BELs manufacturing facility is one of the best of its kind in the world which can offer masts of various types and capacities suiting the customers requirement.

In order to offer quality products, and to meet the budgets of the customers, BEL has designed various premium, performance, economy and popular operating systems. If price is not a constraint we propose to go for our premium operating system.

### Advantages

Best space utilization | Perfect suspension | Maintenance friendly | Double drum winches | Motorized operation | Sleek and aesthetic

### Applications

Airports and sea ports | Railway sidings and yards | Car parks and junctions | Highways and expressways | Industrial flood lighting | Top security zones | Switchyards | Special applications | Sports arenas/stadiums

### Design

Masts are designed as per technical report No.7 of ILE UK, SABS0225, wind velocity as per IS 875 part 3 in India and as per the relevant local standards in other countries. The method of construction using overlapping joints provides good damping and greatly resists resonance caused by wind induced oscillations. The mechanical and electrical systems are generally conform to the requirement of ILE TR, No. 7.

BEL has successfully conducted wind tunnel testing for the mast specimen to arrive at correct force co-efficient at Wichita State University, Kansas USA.

### Mast Construction

The highmast shaft is in polygonal shape, continuously tapered sections having dimensions and thickness as required in the design made from high tensile steel conforming to BSEN 10025 grade S 355. The plate is plasma cut and folded to form polygon of required shape and then welded along longitudinal seams. BEL section lengths are typically designed and are such that transverse welding is not required.

The detailed welding procedures and procedure qualifications are done as per the requirements of standard through renowned third party agency. The partial penetration welds done through GMAW and SAW are proven over a period of time in masts of all heights and for all applications.

Highmast for Special Application



The taper fit friction joints are assembled at site with equipments usually available at construction sites and site fabrication work is not required during assembly. The overlap required is 1.5 times the diameter at the joint.

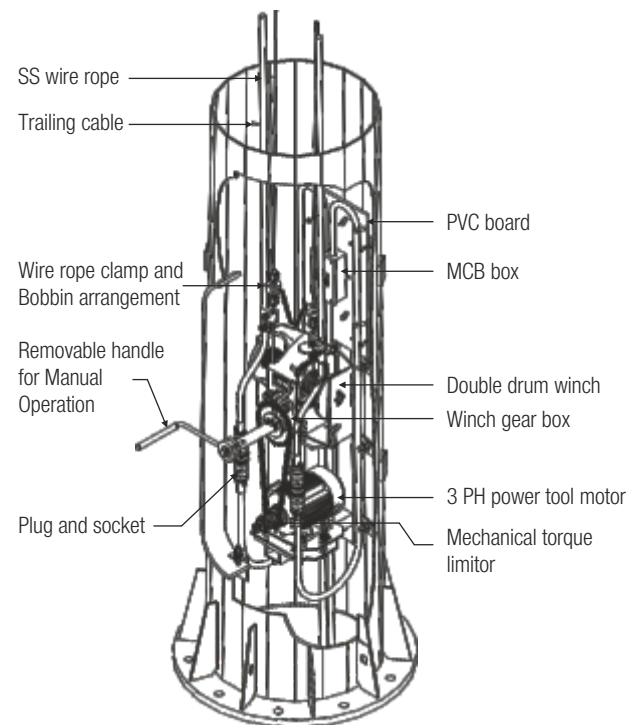
The edge of the door opening is reinforced to guard against buckling and is provided with vandal resistant locking device. The shaft is attached to the flange using full strength butt welds with supplementary gussets provided between bolt holes. All steel work is generally galvanized to BS EN ISO 1461 or other standards agreed in contract.

### Mast Head Assembly

The mast head assembly is fitted with a three-six pulley system which can accommodate wire ropes and electric cables as per the requirements. The pulley is of non-corrodible material and run on self lubricating bush bearing with stainless steel spindle of diameter appropriate for wire rope and multi core flexible cable. Arrangement is provided to separate electric cables and steel wire ropes and also to prevent ropes and cables leaving the pulleys grooves.

Pulleys are housed in a chassis integral with a sleeve which slips over the top of the mast and is secured axially and in azimuth. Guides and stops are provided for docking the luminary carriage. The complete assembly is hot dip galvanized after fabrication. The pulley assembly is protected with a weatherproof hot dip galvanized canopy.

Depending on the requirement we can provide 3 ropes and cables. We can also provide pulley arrangement for special application.



Typical arrangement of base compartment with DDMFO type winch (Premium System)



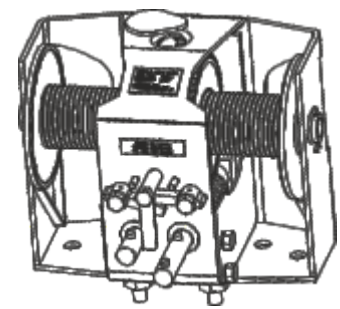
Road Illumination with ornamental bracket at Surat

## Luminaires Carriages

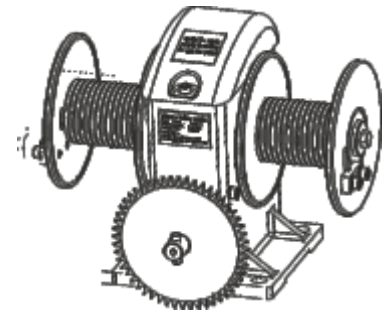
The luminaires carriage is fabricated from ERW steel pipes designed to act as electric conduit with holes for cable entry. It is fitted with junction box mounting bracket(s) and is in two halves joined by bolted flanges to permit removal from an erected mast. Luminaires fixing arms and plates are welded to the carriage. Carriage is fitted with buffer arrangements to prevent damage to the mast finish during movement. Rollers or other moving parts are not required.

## Winches

Winches are completely self sustaining, self lubricating by means of oil bath, grooved double drum with a gear ratio of 53:1. Single gear and double gear design of winches are available in BEL range. Winches can be operated by a motor or manually. Power tools for operating the winch are available in integral or common versions. BEL winches have been rigorously type tested based on the relevant standards under the guidance and presence of experts from Indian Institute of Technology, Bombay - Mumbai.



DDMFO Type Winch



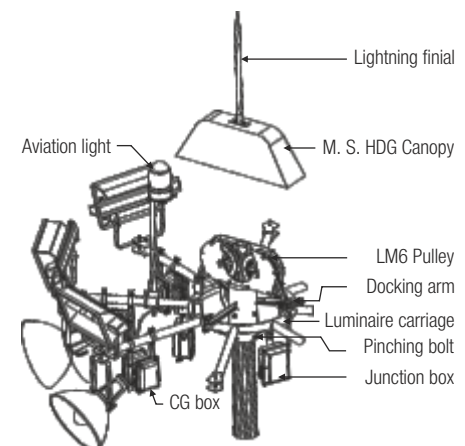
SGDD Type Winch

## Suspension System

Suspension wires are stainless steel grade 316/304 of 7/19 (6/19 WSC) construction and are provided with stainless steel thimble and terminals. Normal suspension systems are with two continuous wire ropes without any intermediate joints. Suspension systems supplied by BEL are properly designed with suitable clamps to prevent entangling of wire ropes and cables. This unique arrangement increases the life of the wire ropes and cables. Other types of suspension systems are also offered against specific requirements.

## Electrical System

Multi core flexible power cables are provided for power supply. Cables are with EPR insulation, PCP sheathing and cotton braiding to get the required strength and flexibility. PVC insulated and PVC sheathed cables are also supplied in economy and popular systems. These cables terminate in the base compartment through specially designed metal clad plugs and sockets. At the mast head cables are connected to weather proof cast aluminum/HDG



Typical arrangement of mast head Assembly with 2 rope head frame

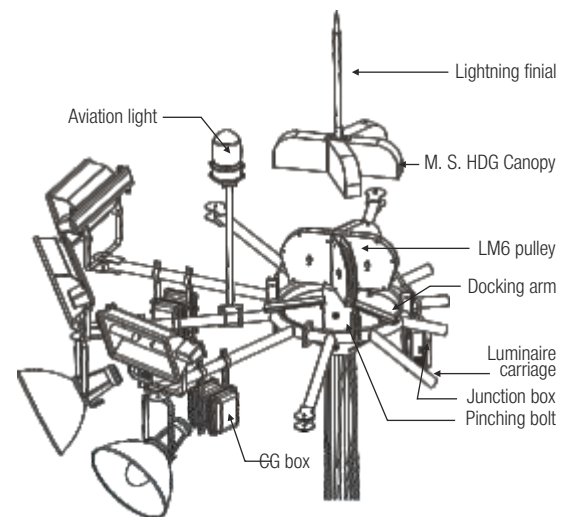




junction box on the luminares carriage. The power cables are factory cut for ease of installation. A box is provided inside the base compartment of the mast for local MCB isolation of the power supply. Masts shall have facility for testing the luminares at the bottom level for premium operating system (this facility is not provided for masts located in hazardous area). Masts in hazardous areas are with a flame proof plug socket unit at the bottom.

### Earth Point and Lightning Finial

A 12mm diameter GI bolt is provided on door stiffener in the base compartment as earth point. All standard masts are provided with a single spike lightning finial on the head frame at the top most point. The mast body acts as conductor and earth strip is connected to the mast door stiffener.



**Mast head assembly with 3 rope head frame for 2/3 rope system**

### Foundation Bolt Set

Foundation bolt set comprises anchor plate with high tensile studs. Mechanical properties of the studs are given in the data sheet. As foundation bolts are very important in the structural safety of the system, BEL supply these bolts as part of the total system. Exposed portion of the stud/nuts and washers are hot dipped galvanized to increase resistance against corrosion.

Design, Engineering, Supply, Installation and Commissioning of illumination system for DIAL-T3, Delhi





Design, Engineering, supply and commissioning of highmasts at Salalah Airport, Oman

#### **Feeder Pillar/ Energy Saving panel / SCADA Control (Optional)**

Various options are available in feeder pillar for operation of luminaires depending on customer requirement for automatic switching of the luminaires in one, two or three groups through analogue, electronic or astronomical time switch. One more option is to provide energy saving panel with or without SCADA control. Feeder pillar will have reversing starter for raising and lowering application. For hazardous areas flame proof feeder pillars are to be used.

#### **Maintenance Cage ( Optional)**

Hot dip galvanized maintenance cage is designed to carry two persons with maintenance equipment to do maintenance at mast head or for painting of the mast for special applications. Suspension ropes have safety factor of more than 10 (supply of maintenance cage is against separate order only).

### Standard Mast Dimensions

Mast Ref.	Height (m)	Bottom A/F (mm)	Top A/F (mm)	Plate thickness (mm)	PCD (mm)	Foundation Bolt*	Luminary Capacity**				
							55m/s	50m/s	47m/s	44m/s	39m/s
BMRLMW11	11	310	100	3	385	M24/750x4	6	6	6	6	6
BMRLMW12	12	310	100	3	385	M24/750x4	6	6	6	6	6
BMRLMW12.5L	12.5	360	100	3/3	445	M24/750x4	8	9	9	9	9
BMRLMW12.5M	12.5	360	150	3/3	445	M24/750x4	8	9	9	9	9
BMRLMW16L	16	360	150	3/3	445	M24/750x6	NA	8	8	8	8
BMRLMW16M	16	410	150	3/3	490	M30/850x8	6	9	12	16	18
BMRLMW16M1	16	410	150	4/3	490	M30/850x8	16	18	18	18	18
BMRLMW16S1	16	460	150	4/3	590	M30/850x8	18	18	24	24	24
BMRLMW20L	20	360	150	3/3	445	M24/850x6	NA	NA	NA	6	9
BMRLMW20M	20	410	150	3/3	490	M30/850x8	NA	8	9	12	18
BMRLMW20M1	20	410	150	4/3	490	M30/850x8	8	12	16	18	18
BMRLMW20S	20	460	150	3/3	590	M30/850x8	6	9	12	16	24
BMRLMW20S1	20	460	150	4/3	590	M30/850x8	12	16	18	18	24
BMRLMW25L	25	460	150	4/4/3	590	M30/850x12	6	9	12	16	18
BMRLMW25L1	25	460	150	5/4/3	590	M30/850x12	8	12	12	18	18
BMRLMW25S	25	540	150	5/4/3	650	M30/850x12	18	24	24	24	24
BMRLMW30L	30	460	150	5/4/3	590	M30/850x12	NA	6	6	9	12
BMRLMW30M	30	540	150	5/4/3	650	M30/850x12	8	12	12	18	24
BMRLMW30M1	30	540	150	5/4/4	650	M30/850x12	8	12	16	18	24
BMRLMW30M2	30	610	150	5/4/3	740	M30/850x12	12	18	18	18	24
BMRLMW30M3	30	610	150	5/4/4	740	M30/850x12	12	18	18	24	24
BMRLMW30S	30	610	150	6/4/3	740	M30/850x12	16	18	18	24	24
BMRLMW30S1	30	610	150	6/4/4	740	M30/850x12	12	18	24	24	24

List gives only the details of few standard masts for guidance. BEL has designed mast of height more than 60m with various combination of luminaires and wind speeds for indian and international market. BEL will provide most economical solution for your each requirement.

\*Use with anchor plate of appropriate dimensions. Exposed nuts, washer and portion of the bolt is galvanized.

\*\*This is with our 2x400W BGENF 22R luminaires in symmetrical arrangement and the maximum capacity for regular loading and for a design life of 25 years. Suitable operating system to be used depending on number of luminaires.

### Luminaires for Highmasts

Following are the most frequently used Bajaj Luminaires on highmasts.

LED Luminaires			HID Luminaires
			
BENP 20FL Series (80W to 350W)	BRLEP 15/20/25/45/60	LED AOL	BJENP GT 2000 - 2000W
HID Luminaires			
			
BGENF 22 R (2x250/400)	BJDAF (2x400/600 - 1x1000)	BGENF 22 (2x600 - 1x1000)	BJFE 18/21/28 (1x250/400/600/1000)



## Street Furniture

BEL Hot dip galvanized smart polygonal and conical poles are in use for illumination, power transmission and distribution, signaling, etc. for various prestigious installations in India and abroad for the last 15 years. The poles are supplied with regular or ornamental brackets and customized attachments depending on the application and specific requirement of the customers.

The poles are designed as per BSEN 40-3-3:2003 to withstand the maximum wind speed as per IS 875 or as specified by client, whichever is higher, for the actual loading of the fixtures.

The pole shaft shall have polygonal (octagonal, hexagonal or as required) or conical section, continuously tapered with one longitudinal submerged arc welding. Each shaft will be provided with base plate, fillet welded from inside and outside. The shaft is constructed from high tensile steel having minimum yield strength of 355 n/sq.mm confirming to BSEN10025, base flange as per IS 2062 and entire structure galvanized as per BS ENISO 1461 through single dip process.

Wherever required, each pole is provided with door at a height of 500mm from bottom or at a higher height as required by client to have access for cable termination and control MCB. The door opening is reinforced from inside to guard against buckling.

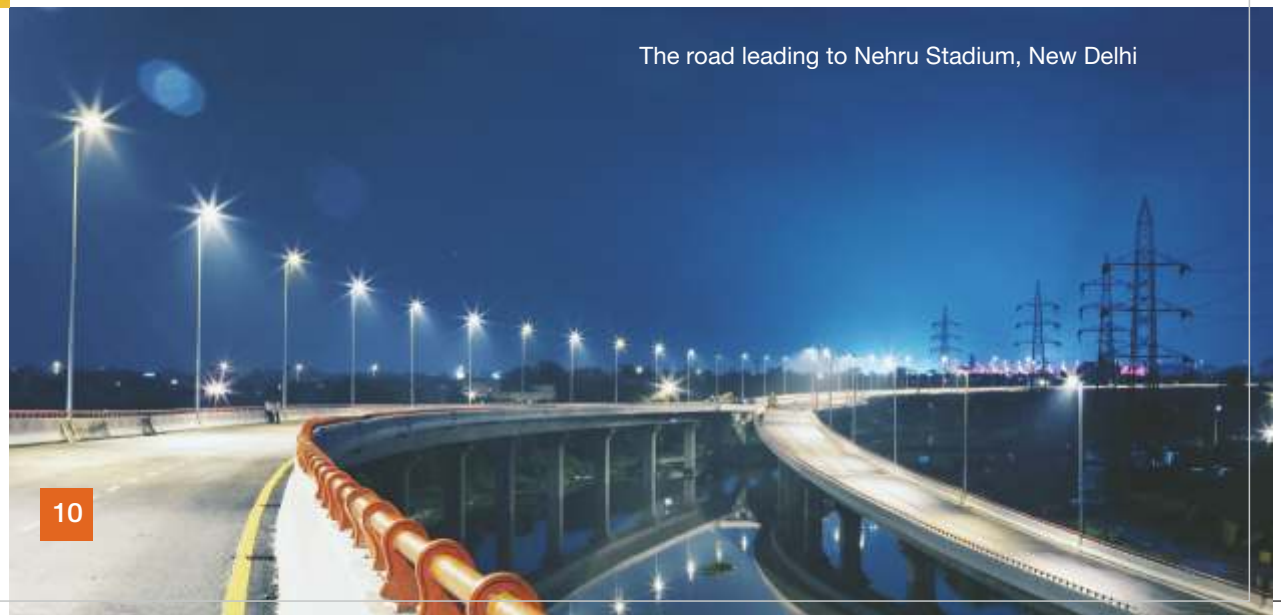
Poles are fixed on precast or cast-in-situ RCC block foundations on studs with nuts and washers. This arrangement facilitates easy relocation of pole along with foundation, if required.

The bracket will have sleeve as cap of suitable diameter to suit with top A/F of pole and the arm length designed as per the illumination design. We can provide decorative brackets galvanized or galvanized and painted to match with ambience of the road for aesthetics.

We have facility to test the pole as per BS EN 40-3-2-2000 part 3-2.

### BEL Turnkey Project Solution

BEL provides turnkey solution from concept to commissioning for street lighting, sports lighting, Industrial electrification, etc. We have in-house facilities for illumination, civil, structural and system design for above projects. Over a decade, BEL has designed and executed energy efficient projects for various clients across India ensuring optimum utilization of installation and lower power consumption. BEL provides SCADA controlled panels, which facilitates monitoring of the installation, locating and maintaining the luminaires. Such systems are successfully in operation at PWD Delhi, MADC Nagpur and other locations for several years now.





### LED Street Light / Tunnel / Under Canopy / Underpass Fixtures



BENP 11SL Series  
(72/90/120/135/150/180/210/350W)



BENP 12SL Series  
(90/120/150/180/210W)



BENP LEP Series  
15/20/25/45/60W



COSMO BGPPR 80/100 W LED

### HID / FTL / Tunnel / Under Canopy / Underpass Fixtures



BJRMB 150 MH DE/SE



BJRLB 70 SV/MH DE/SE



BJTL 70/150/250/400 SV/MHT

### HID Street Light Fixtures



MOMENTUM  
BGEST 250/400 SV/MH IP66



JET BJRL  
150 SV/MH IP66 CG FFG



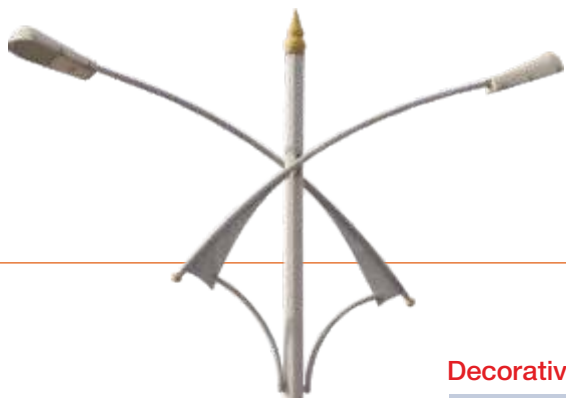
JET BJRL  
250/400 SV/MH IP66 CG FFG



CORAL  
BGQRGK 400 SV/MH/50/250W



BGEST 250 SHN  
SV/MH IP65 FFG



Decorative Brackets



Western Express Highway, Mumbai



### Standard Octagonal Poles (Technical Data Sheet)

Pole Type	Height	Top Dia. (A/F)	Bottom Dia. (A/F)	Sheet Thickness	Base Plate Dimensions (LxBxT) (mm)	Bolt Size (No. x Dia) (mm)	Foundation Bolt		
	(m)	(mm)	(mm)	(mm)			Pitch Circle Dia (PCD) (mm)	Bolt Length (mm)	Projected Bolt Length (mm)
BOP-3030	3	70	130	3	200x200x12	4x16 Dia	200	450	80
BOP-4030	4	70	130	3	200x200x12	4x16 Dia	200	450	80
BOP-5030	5	70	130	3	200x200x12	4x16 Dia	200	450	80
BOP-6030	6	70	130	3	200x200x12	4x20 Dia	200	600	100
BOP-7030	7	70	130	3	200x200x12	4x20 Dia	200	600	100
BOP-8030	8	70	130	3	200x200x16	4x20 Dia	200	600	100
BOP-9030	9	70	155	3	250x250x16	4x24 Dia	250	750	125
BOP-9031	9	70	130	3	200x200x16	4x20 Dia	200	600	100
BOP-1030	10	70	175	3	275x275x16	4x24 Dia	275	750	125
BOP-1031	10	70	155	3	250x250x16	4x24 Dia	250	750	125
BOP-1130	11	90	210	3	300x300x16	4x24 Dia	300	750	125
BOP-1230	12	90	240	3	320x320x16	4x24 Dia	320	750	125
BOP-1231	12	90	210	3	300x300x16	4x24 Dia	300	750	125

**Note :**

1. The octagonal poles shall be hot dip galvanized in single dip as per BS EN ISO 1461.
2. The dimensions are suitable to mount 2 nos. BEL make BGEST 400W or equivalent fixtures and standard bracket combination and are suitable for wind speed up to 169 Kmph (47m/s). For other wind speed and fixture/bracket combination pl contact us.
3. Apart form above we design and supply poles for other wind speeds in combination of various luminaires and standard/decorative brackets against specific enquiry.

### Standard Conical Poles (Technical Data Sheet)

Pole Type	Height	Top Dia. (Dia)	Bottom Dia.	Sheet Thickness	Base Plate Dimensions (LxBxT) (mm)	Bolt Size (No. x Dia) (mm)	Foundation Bolt		
	(m)	(mm)	(mm)	(mm)			Pitch Circle Dia (PCD) (mm)	Bolt Length (mm)	Projected Bolt Length (mm)
BCP-3030	3	75	107	3	200x200x12	4x16 Dia	200	450	80
BCP-4030	4	75	118	3	200x200x12	4x16 Dia	200	600	80
BCP-5030	5	75	129	3	200x200x12	4x16 Dia	200	600	80
BCP-6030	6	75	140	3	200x200x16	4x20 Dia	210	600	100
BCP-7030	7	75	151	3	250x250x16	4x20 Dia	235	700	100
BCP-8030	8	75	162	3	250x250x16	4x20 Dia	235	750	100
BCP-9030	9	75	173	3	275x275x16	4x24 Dia	270	750	125
BCP-1030	10	75	184	3	275x275x16	4x24 Dia	270	750	125
BCP-1130	11	85	206	3	300x300x16	4x24 Dia	300	750	125
BCP-1131	11	75	195	3	300x300x16	4x24 Dia	300	750	125
BCP-1230	12	96	228	3	320x320x16	4x24 Dia	320	850	125
BCP-1231	12	75	206	3	300x300x16	4x24 Dia	320	750	125

**Note :**

1. The conical poles shall be hot dip galvanized in single dip as per BS EN ISO 1461.
2. The dimensions are suitable to mount 2 nos. BEL make BGEST 400W or equivalent fixtures and standard bracket combination and are suitable for wind speed up to 169 Kmph (47m/s). For other wind speed and fixture/bracket combination please contact us.
3. Apart form above we design and supply poles for other wind speeds in combination of various luminaires and standard/decorative brackets against specific enquiry.

## Monopoles for Telecommunications / CCTV

Monopole structures are ideal for mounting telecommunications equipments where aesthetics and limitation of space are of prime concern like metros and other cities. Its sleek and elegant look enhances the look of the installation while meeting the requirement of mounting required number of antennas as well as luminaires at an intermediate height to illuminate the local area (Optional).

Due to this advantage developed countries are using monopoles extensively for telecommunication purposes. However, its use in India was limited till recently. BEL introduced Monopole antenna masts in India few years back. BEL have so far supplied such masts to Bharat Sanchar Nigam Limited, Motorola for their DMRC project, Reliance Infocomm Limited for their VPT project and others.

Telecommunication masts are designed with a fixed platform at the top. Provision for required number of microwave or GSM antennas can be provided on the top platform. If required, masts with multiple platforms can also be supplied.

Design parameters for telecommunication masts are more stringent compared to normal lighting masts. Allowable deflection during wind is very low for these types of masts. BEL with a team of experienced designers can design and execute towers as per the customer requirements.

Another important use for monopoles is for mounting CCTV cameras. CCTV mast have several applications like monitoring the safety of sensitive installations. Monitoring of traffic on highways etc.



Design, Engineering, Supply, Installation and Commissioning of Radio Tower for DMRC, Delhi



## Masts for Special Applications

BEL has designed the mast for the installation of Flag, Panoramic Applications, Umbrella Mast, Lighting and Lightening Mast, Lighting and Advertising Mast in raising and lowering system.

BEL has done design, supply, erection and commissioning of Indias tallest flag mast 82m and largest flag (105x70 Ft) at various locations.

Umbrella masts are with fixed or raising and lowering system are designed and supplied for NHAI, JNS, Municipalities; with GRP or steel canopy. It is appropriate to have GRP Umbrella in view of aesthetics.

BEL has designed special masts to provide illumination and lightening protection for switchyards where illumination is provided at intermediate height. This will facilitate easy maintenance also save space and enhance aesthetics of the installation.

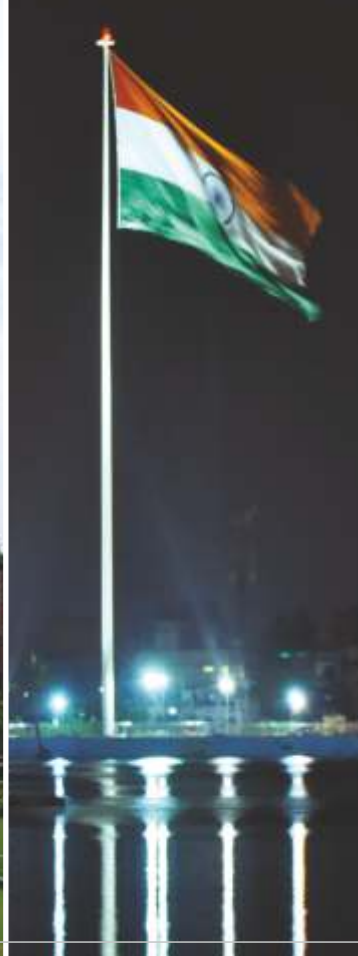
BEL has masts for illumination and advertising which can be used in city junctions, dividers, open areas, public places etc.

One more application is road lighting with decorative carriage/bracket. While providing uniform illumination in the night it gives aesthetic look in the day time. BEL has executed project for CIDCO and Surat Muncipal Corporation.

Design, Engineering,  
Manufacture and Supply  
of Umbrella Mast at  
Katipara Junction, Chennai



Flag Mast, Raipur



Lighting and Lightening Mast



## Fixed Head Masts for Sports Lighting

### Stadium Lighting

Development in technology has changed the way of life in sports arena also these days, matches are played at night with the same ease as that in the day. Efficient floodlighting is the main requirement to make this possible.

Fixed head polygonal masts are the ideal means to illuminate stadiums to international standards. These masts are normally manufactured in the polygonal tapered sections and assembled at site. The top platform and the masts are designed to carry required number of floodlight luminaires.

BEL is the market leader in India, having illuminated more than 100 indoor and outdoor stadium lighting with fixed head polygonal structures. With all in-house facilities for lighting design, structural design, manufacturing and installation, BEL can offer flood lighting solutions for any sports activities.

BEL has executed sports lighting work in Mumbai, Delhi, Chandigarh, Hyderabad, Jaipur, Ranchi, Guwahati, Kanpur, Bangalore, Chennai, Dubai, Ras-al-Khaima (UAE), Hatta (UAE), Seeb in Mascut, Football stadium in Mauritius, Belize-South America etc.

Design, Engineering, Supply, Installation and Commissioning  
of illumination system for Wankhede Stadium, Mumbai



## Signage Masts and Mid-Hinged Lighting Masts

### Signage Masts

Utility of raising and lowering winch masts in advertising was also introduced in the Indian market by BEL. This innovative idea, mooted by BEL gathered its momentum very fast.

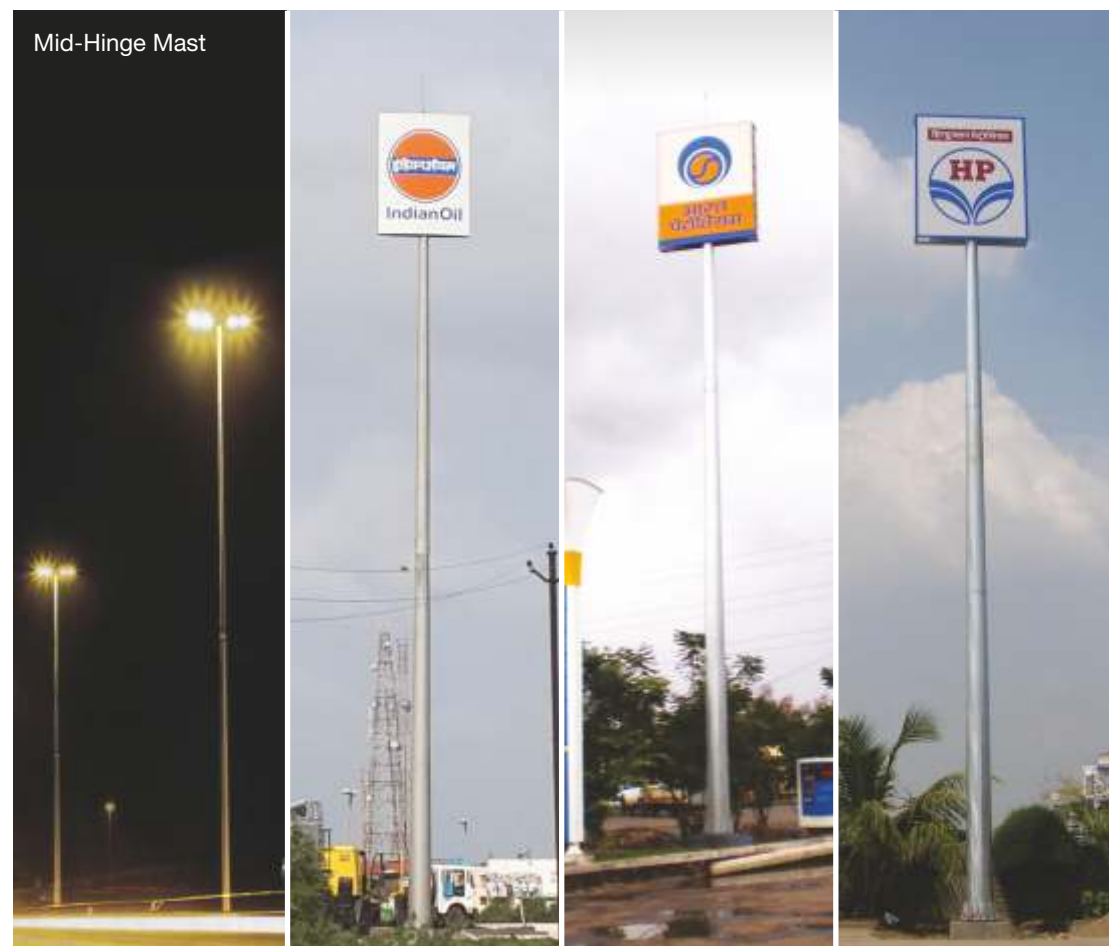
Today, all petroleum companies like IOCL, BPCL and HPCL are using these masts as their main mean of advertising in highway and other strategic outlets.

### Mid-Hinged Type Masts

These masts are fitted with a heavy duty hinging arrangement at the middle. The luminaires mounted at the top can be lowered down using this hinge for installation/maintenance.

Mid-hinged masts have a jacket extending from the middle to the bottom. The operator can tie a rope at the end of this jacket and raise/lower the luminaires. These masts can be operated manually by a single operator. Due to operational limitations, these masts are normally designed to accommodate up to four/six/eight luminaires only.

Mid-hinged masts are suitable for illuminating open areas, parks, high ways, car parking, etc.





## Road Signage and Hoarding

BEL was the first to come with innovative polygonal hot dip galvanized road signage structures for MMRDA in Mumbai and since then similar projects were executed for various clients in India. BEL has also executed jobs for PWD, Delhi, CPWD Patna, RSVY in Gaya and Patna circle for various sign boards, gantries and cantilevers as per their specifications with painted pipe and angle structures.

In-house state of the art manufacturing facilities with hot dip galvanized polygonal structures and state-of-the-art sign shop at Chakan ensures highest quality of the products.



### The Unique Features

- In-house civil and structural and graphic design
- State-of-the-art manufacturing facilities
- State-of-the-art sign shop
- Full fledge marketing, project management and execution team
- After sales service

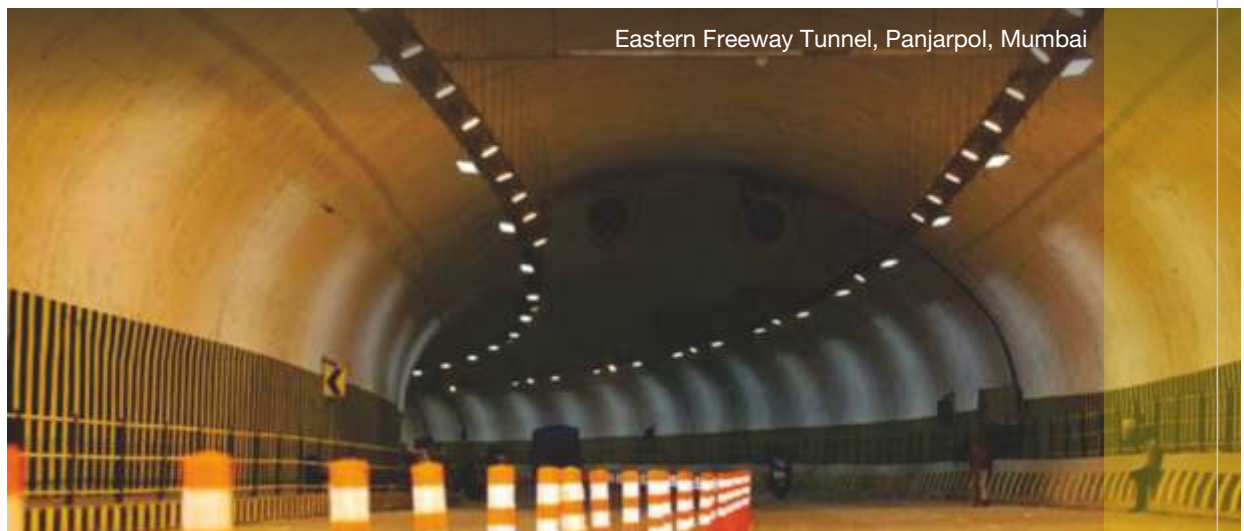
Hot dip galvanized polygonal hoarding structures are extensively used in developed countries. BEL has supplied these structures to some customers in India. The unique advantage is that it doesn't require any maintenance due to hot dip galvanization apart from having aesthetics. Moreover, as it is mounted on foundation with bolts and of modular design it is very easy to relocate.





## Tunnel Lighting Design, Engineering and Execution

Tunnel lighting is a complex and specialized job. Visual comfort of the vehicle drivers is the most important aspect of tunnel lighting. This is because of the fact that, at daytime, there is very high light level on the exterior road surface whereas the interior of a tunnel is very dark. Human visual system cannot adapt to such high difference of light level in a short time span. Therefore while approaching a tunnel in daytime, it creates a 'black hole' effect for the drivers, i.e. a temporary blindness, which may lead to accidents and hazards. A similar phenomenon occurs while exiting the tunnel in to bright exteriors. Lighting system of a tunnel is always suitably designed to counter these situations.



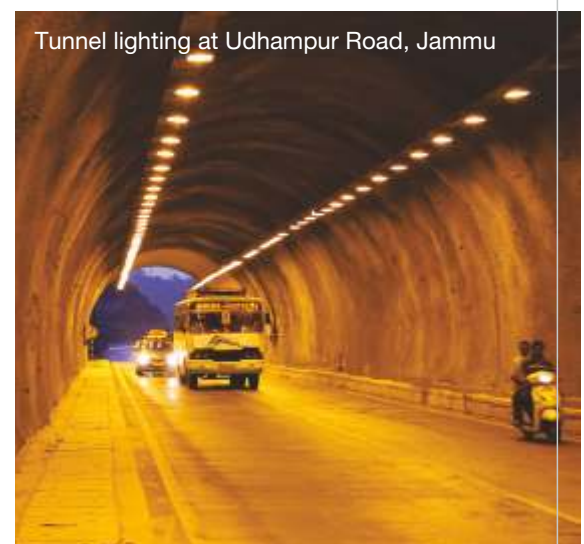
Eastern Freeway Tunnel, Panjarpol, Mumbai

The CIE guideline (CIE 88:2004) states the methodology for calculating the lighting level of the tunnel according to the environmental lighting conditions, driving speed etc. Each tunnel is divided into four major lighting zones according to the length. They are - threshold, transition, interior and exit zones. Each zone has different and gradually changing lighting level to provide a comfortable and smooth visual transition from brighter to darker zone and vice-versa.

At night, the problem of such high level of visual adaptation is not there, so the lighting requirements also becomes completely different. At night time there should be a uniform light level throughout the tunnel matching with the external road lighting.

Therefore a suitable switching system is designed for each tunnel based on the photo-sensor and timer controllers. This system adjusts the lighting level during different time of the day and different environmental conditions by dimming or switching appropriate circuits.

Corrosive atmosphere is common in tunnels so selecting appropriate materials is important. Furthermore, a tunnel is a place where maintenance accessibility is limited. The entire system is designed keeping these in mind. BEL has an in-house design, engineering and execution cell to execute such a complex job with perfection and reliability. BEL has already completed APLR twin tunnels in Mumbai and total of 8 tunnels on Jammu Udhampur section of National Highway.



Tunnel lighting at Udhampur Road, Jammu

## Manufacturing Facilities



Ranjangaon Factory

### State-of-the-art machineries installed at BEL Plant.

1. Plasma Cutting Machine Messer, German Make
2. LVD Press Brake, Belgian Make
3. Automatic Submerged ARC welding machine Lincoln, Bode, UK Make
4. Radio remote controlled galvanizing plant Gimeco, Italy Make



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## Other Products in Range



Decorative Polysteel Poles



GRP Poles



Gazebo



Cast Iron and Cast Aluminium Poles



Theme Lighting - Bhudha Smriti Park



Theme Lighting - Bhudha Smriti Park



## Client Profile

BEL entered into the field of raising and lowering winch masts more than 30 years ago. Since then BEL has been the undisputed leader in the Indian market.

During this period more than 45000 masts and 750000 poles of different designs were installed in India and abroad. List of our esteemed clientele is exhaustive, but include.

- ABB Ltd.
- Adani Power Ltd. / Mundra Port & SEZ Ltd.
- Alstom T & D India Limited
- Bengaluru International Airport Ltd.
- Bharat Heavy Electric Ltd.
- Bharat Petroleum Corporation Ltd.
- Chennai Port Trust
- CIDCO
- Coal India
- Container Corporation of India
- CPWD & PWD
- Damodar Valley Corporation
- Delhi International Airport Ltd. T-3
- Essar Oil Ltd. / Essar Steel Ltd.
- GMR Group
- GVK Group of Companies.
- Haldia Dock Complex
- Hindalco
- Hindustan Mittal Pipeline Ltd.
- Hindustan Petroleum Corporation Ltd.
- Indian Oil Corporation Ltd.
- Indian Railways
- Jawaharlal Nehru Port Trust
- JAYPEE
- Jindal Steel & Power Ltd.
- JSW
- Kochi International Airport
- L&T
- MMRDA
- Mumbai International Airport Ltd.
- National Highway Authority of India
- National Thermal Power Corporation Ltd.
- NCC Ltd.
- New Mangalore Port Trust
- Neyveli Lignite Corporation Ltd.
- Oil & Natural Gas Corporation Ltd.
- Oriental Structures Engineers (P) Ltd.
- P&O Ports (India) Ltd.
- Reliance Industries Ltd.
- Shapoorji Pallonji & Co. Limited
- Steel Authority of India
- Surat Municipal Corporation
- Tata Steel Ltd.
- Various Municipal Corporations
- Vedanta Group
- Vishakhapatnam Port Trust
- West Bengal Power Development Corporation Ltd.

We are proud that BEL raising and lowering masts are providing the leading light to the industrial and infrastructural development of India.

### Exports

Apart from the Indian market, BEL caters to international markets also. BEL has exported highmast systems to the following countries till date.

 BAHRAIN	 KENYA	 OMAN	 TANZANIA
 EGYPT	 KUWAIT	 PARAGUAY	 UAE
 ETHIOPIA	 MADAGASCAR	 QATAR	 YEMEN
 GHANA	 MAURITIUS	 SAUDI ARABIA	 ZAMBIA
 GUYANA	 NEPAL	 SOUTH AFRICA	
 INDONESIA	 NIGERIA	 SRI LANKA	
 JORDAN	 NORWAY	 SUDAN	







**Bajaj Electricals Ltd.**

**BAJAJ** *Inspiring Trust*

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**For Post-order query (I-SUPPORT)**

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