सेल SAIL

Structurals from SAIL













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20T
JBS TRAILOR SERVICE

SAIL is one of the largest and leading steel manufacturer of India and possesses a robust knowhow and expertise to produce a wide variety of prime steel products such as Plates, Sheets, Coils, Rebars, Structural, Rails, Pipes etc. for various applications.

SAIL has set up State-of-the-art Universal Section Mill (USM) at IISCO Steel Plant, Burnpur and Medium Structural Mill (MSM) at Durgapur Steel Plant. SAIL is in a position to supply a wide variety of Parallel Flange Sections (PFS) and Conventional Structurals with high quality and consistent dimensional accuracy to meet the requirement of construction and infrastructure segments in the country.

SAIL has been endeavoring superior quality of high performing end products through investment in technological upgradations, continuous R&D (Research & Development) & Services.



AVAILABLE GRADES/QUALITIES

- IS 2062 E250BR, 300BR, 350BR, 410BR, 450BR.
- EN 10025 2 S275 JR, S355 JR (for exports / IPEs).

  (Structurals in IS specifications can be supplied in Grade B0 & Grade C with mutual agreement.)

  (Structurals with Copper addition (0.20 - 0.60%) can also be supplied).

In addition to above **IS 11587 WR 480A & 480B (WEATHER RESISTANT)** grades can also be supplied.

Sections from MSM & USM are normally supplied in 12 meter length. However specific lengths can be supplied with mutual agreement

Testing facilities available - Tensile, bend, impact testing (including sub zero temp testing) and inspection of finished products. Bundling - Automatic strapping & bundling facility with tagging. Mill Certifications available with MSM of DSP

● CE Certificate ● Certificate from CSIR and CBRI, Roorkee for Fire Resistant Steel

Abbreviations used :

MSM - Medium Structural Mill

DSP - Durgapur Steel Plant

SM - Section Mill, Durgapur

BSP - Bhilai Steel Plant

USM - Universal Section Mill

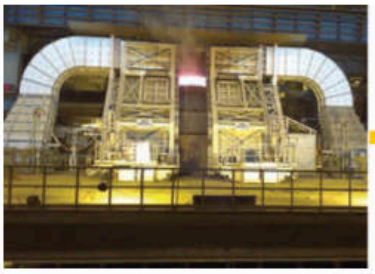
ISP - IISCO Steel Plant, Burnpur

EPA - External Processing Agency

MM - Merchant Mill, Bhilai



Process Flow : Universal Section Mill (USM - ISP)


Basic Oxygen Furnace

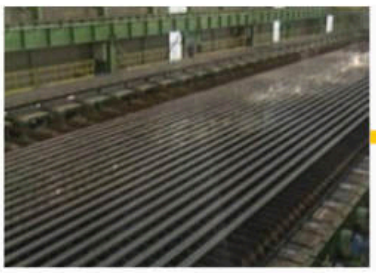

Continuous Caster


Beam Blanks


Walking Beam Furnace


Roughing Stand


Universal Rolling Stand

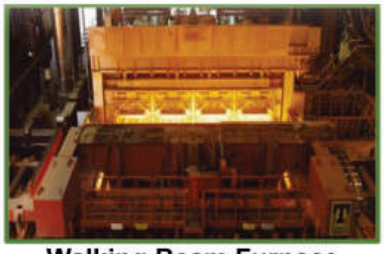

Cooling Bed


Straightening Machine


Piling Machine

Process Flow : Medium Structural Mill (MSM - DSP)


Input Blooms

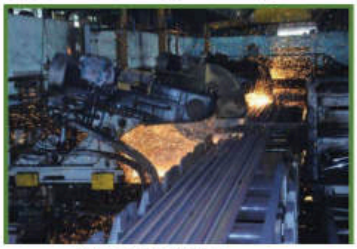

Walking Beam Furnace


Universal Mill


Dividing Shear


Cooling Bed


Straightening


Saw Cutting


Stacking and Bundling


Finished Product

PRODUCT RANGE

Parallel Flange Sections (PFS)

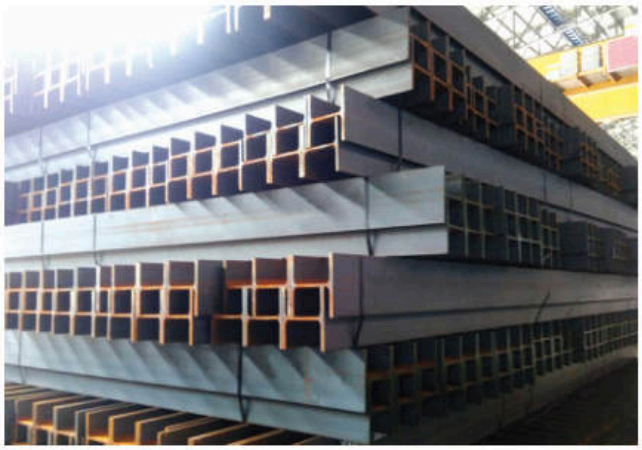
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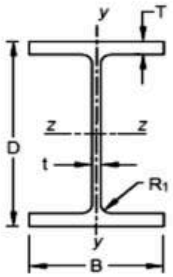
Narrow Parallel Flange Beams				
Section	**Weight (Kg/m)**	**Plant**	**Mill**	**Equivalent European I Beam**
NPB 100 x 55	8.1	DSP	MSM	IPE 100
NPB 200 x 100	22.36 / 25.09	DSP	MSM	IPE 200/ IPE 200 O
NPB 250 x 125	30.11	DSP	MSM	IPE 250
**NPB 270 x 135	30.73/36.07/42.26	ISP	USM	IPE 270 A/ IPE 270/ IPE 270 O
NPB 300 x 150	36.53/42.24/49.32	ISP	USM	IPE 300 A/ IPE 300/ IPE 300 O
**NPB 350 x 170	50.22/57.10/66.05	ISP	USM	IPE 350 A/ IPE 350/ IPE 350 O
NPB 400 x 180	57.38/66.31/75.67/84.00	ISP	USM	IPE 400 A/IPE 400/ IPE 400 O/ IPE 400 V
NPB 450 x 190	67.16 / 77.58/92.37/95.20/104	ISP	USM	IPE 450 A/IPE 450/ IPE 450 O/ IPE 450 R / IPE 450 V
NPB 500 x 200	79.36/90.69/107.32	ISP	USM	IPE 500 A/ IPE 500/ IPE 500 O
**NPB 550 x 210	92.08/105.52/122.52	ISP	USM	IPE 550 A/ IPE 550/ IPE 550 O
NPB 600 x 220	107.57/122.45/154.47/184.00	ISP	USM	IPE 600/IPE 600 O/ IPE 600V
NPB 750 x 270	173.00/174.54/185.00/196.00/202.49	ISP	USM	IPE 750 A/IPE 750/ IPE 750 O/ IPE 750 R / IPE 750 V
Wide Parallel Flange Beams				
Section	**Weight(Kg/m)**	**Plant**	**Mill**	**Equivalent European H Beam**
**WPB 150 x 150	23.5/30.11/36.97	DSP	MSM	HE 150 AA/HE 150 A/HE 150 B
WPB 160 x 160	22.75/30.44/42.59/76.19	DSP	MSM	HE 160 AA/HE 160 A/HE 160 B/ HE 160 M
WPB 200 x 200	37.34	ISP	USM	
WPB 200 x 200	34.65/42.26/61.30 / 50.92*	ISP	USM	HE 200 AA/HE 200 A/HE 200 B /HE 200 M
WPB 240 x 240	47.40/60.32/83.20/156.68	ISP	USM	HE 240 AA/HE 240 A/HE 240 B/HE 240 M
WPB 300 x 300	100.85 / 69.80 */ 88.34*	ISP	USM	HE 300 AA/ HE 300 A
WPB 300 x 300	117.03/237.92	ISP	USM	HE 300 B/ HE 300 M
**WPB 340 x 300	78.90/104.78/134.16/290.64	ISP	USM	HE 340 AA/HE 340 A/HE 340 B/HE 340 M
**WPB 450 x 300	139.76/171.12/263.33 / 99.75	ISP	USM	HE 450 AA/HE 450 A/HE 450 B/HE 450 M

** New Section: Under Development

*New Variant: Under Development







- D : Depth
- B : Flange Width
- T : Flange thickness
- t : Web thickness
- R_1 : Root radius

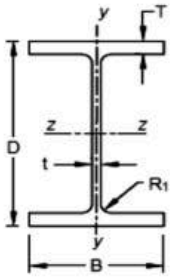
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SAIL NEX STRUCTURALS (PFS-NPB)

Sectional Properties (Conforming to IS 808:2021), Narrow Parallel Flange Beams (NPB)

Designation	Mass	Area	Dimensions					Properties											
NPB	M	A	D	B	t	T	FlangeSlope(α)	R1	R2	Izz	Iyy	rz	ry	Zzz	Zyy	Zpz	Zpy	It	Iw
	kg/m	Å$x10^2$ mm^2	mm	mm	mm	mm	degrees	mm	mm	Å$x10^4$ mm^4	Å$x10^4$ mm^4	mm	mm	Å$x10^3$ mm^3	Å$x10^3$ mm^3	Å$x10^3$ mm^3	Å$x10^3$ mm^3	Å$x10^4$ mm^4	Å$x10^6$ mm^6
NPB 100 x 55 x 8.10	8.10	10.3	100	55	4.1	5.7	90.0	7.0	0.0	171	15.9	40.7	12.4	34.2	5.78	39.4	9.14	1.15	351
NPB 200 x 100 x 22.36	22.36	28.4	200	100	5.6	8.5	90.0	12.0	0.0	1,940	142	82.6	22.3	194	28.4	220	44.6	6.92	12,900
NPB 200 x 100 x 25.09	25.09	31.9	202	102	6.2	9.5	90.0	12.0	0.0	2,210	168	83.1	22.9	218	33.1	249	51.8	9.36	15,500
NPB 250 x 125 x 30.11	30.11	38.3	250	125	6.0	9.0	90.0	15.0	0.0	4,130	294	103	27.7	331	47.0	373	73.6	11.1	42,500
NPB 270 x 135 x 30.73	30.73	39.1	267	135	5.5	8.7	90.0	15.0	0.0	4,910	357	112	30.2	368	53.0	412	82.3	10.4	59,500
NPB 270 x 135 x 36.07	36.07	45.9	270	135	6.6	10.2	90.0	15.0	0.0	5,780	419	112	30.2	428	62.2	483	96.9	15.9	70,500
NPB 270 x 135 x 42.26	42.26	53.8	274	136	7.5	12.2	90.0	15.0	0.0	6,940	513	113	30.8	507	75.5	574	117.0	25.0	87,600
NPB 300 x 150 x 36.53	36.53	46.5	297	150	6.1	9.2	90.0	15.0	0.0	7,170	518	124	33.4	483	69.1	541	107.0	13.3	1,07,000
NPB 300 x 150 x 42.24	42.24	53.8	300	150	7.1	10.7	90.0	15.0	0.0	8,350	603	124	33.5	557	80.5	628	125.0	19.9	1,25,000
NPB 300 x 150 x 49.32	49.32	62.8	304	152	8.0	12.7	90.0	15.0	0.0	9,990	745	126	34.4	657	98.1	743	152.0	30.9	1,57,000
NPB 350 x 170 x 50.22	50.22	63.9	357.6	170	6.6	11.5	90.0	18.0	0.0	14,500	944	150	38.4	811	111	906	171.0	27.3	2,81,000
NPB 350 x 170 x 57.10	57.10	72.7	360	170	8.0	12.7	90.0	18.0	0.0	16,200	1040	149	37.8	903	122	1010	191.0	37.4	3,13,000
NPB 350 x 170 x 66.05	66.05	84.1	364	172	9.2	14.7	90.0	18.0	0.0	19,000	1250	150	38.5	1040	145	1180	226.0	55.7	3,80,000
NPB 400 x 180 x 57.38	57.38	73.0	397	180	7.0	12.0	90.0	21.0	0.0	20,200	1,170	166	40.0	1,020	130	1,140	202.0	36.1	4,32,000
NPB 400 x 180 x 66.31	66.31	84.4	400	180	8.6	13.5	90.0	21.0	0.0	23,100	1,310	165	39.5	1,150	146	1,300	229.0	51.3	4,90,000
NPB 400 x 180 x 75.67	75.67	96.3	404	182	9.7	15.5	90.0	21.0	0.0	26,700	1,560	166	40.2	1,320	171	1,500	269.0	73.3	5,87,000
NPB 450 x190 x 67.16	67.16	85.5	447	190	7.6	13.1	90.0	21.0	0.0	29,700	1,500	186	41.9	1,330	158	1,490	245.0	47.1	7,04,000
NPB 450 x 190 x 77.58	77.58	98.8	450	190	9.4	14.6	90.0	21.0	0.0	33,700	1,670	184	41.1	1,490	176	1,700	276.0	66.7	7,91,000
NPB 450 x 190 x 92.37	92.37	117	456	192	11.0	17.6	90.0	21.0	0.0	40,900	2,080	186	42.1	1,790	217	2,040	340.0	109	9,97,000
NPB 450 x 190 x 104	104.00	132.0	460	194	12	19.6	90.0	21.0	0.0	46200	2397.0	187	42.6	2,009	247	2,301	389.0	150	11,60,000

Dimensional Tolerances will be conforming IS 12779 : 1989 (1995)



- D : Depth
- B : Flange Width
- T : Flange thickness
- t : Web thickness
- R_1 : Root radius

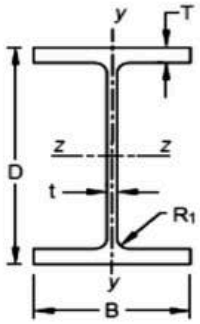
NEX From SAIL
Structurally Ahead

SAIL NEX STRUCTURALS (PFS-NPB)

Sectional Properties (Conforming to IS 808:2021), Narrow Parallel Flange Beams (NPB)

Designation	Mass	Area	Dimensions					Properties											
NPB	M	A	D	B	t	T	FlangeSlope(α)	R1	R2	Izz	Iyy	rz	ry	Zzz	Zyy	Zpz	Zpy	It	Iw
	kg/m	Åx10² mm²	mm	mm	mm	mm	degrees	mm	mm	Åx10⁴ mm⁴	Åx10⁴ mm⁴	mm	mm	Åx10³ mm³	Åx10³ mm³	Åx10³ mm³	Åx10³ mm³	Åx10⁴ mm⁴	Åx10⁶ mm⁶
NPB 500 x 200 x 79.36	79.36	101	497	200	8.4	14.5	90.0	21.0	0.0	42,900	1,930	206	43.8	1,720	193	1,940	301	64.3	11,20,000
NPB 500 x 200 x 90.69	90.69	115	500	200	10.2	16.0	90.0	21.0	0.0	48,100	2,140	204	43.0	1,920	214	2,190	335	89.1	12,40,000
NPB 500 x 200 x 107.32	107.32	136	506	202	12.0	19.0	90.0	21.0	0.0	57,700	2,620	205	43.7	2,280	259	2,610	408	142	15,40,000
NPB 550 x 210 x 92.08	92.08	117	547	210	9.0	15.7	90.0	24.0	0.0	59,900	2,430	226	45.5	2,190	232	2,470	361	89.3	17,10,000
NPB 550 x 210 x 105.52	105.52	134	550	210	11.1	17.2	90.0	24.0	0.0	67,100	2,660	223	44.5	2,441	254	2,780	400	122	18,80,000
NPB 550 x 210 x 122.52	122.52	156	556	212	12.7	20.2	90.0	24.0	0.0	79,100	3,220	225	45.4	2,840	304	3,260	480	187	23,00,000
NPB 600 x 220 x 107.57	107.57	137	597	220	9.8	17.5	90.0	24.0	0.0	82,900	3,110	246	47.6	2,770	283	3,140	442	122	26,00,000
NPB 600 x 220 x 122.45	122.45	155	600	220	12.0	19.0	90.0	24.0	0.0	92,000	3,380	242	46.6	3,060	307	3,510	485	165	28,40,000
NPB 600 x 220 x 154.47	154.47	196	610	224	15.0	24.0	90.0	24.0	0.0	1,18,000	4,520	245	47.9	3,870	403	4,470	640	316	38,50,000
NPB 600x220x183.52	183.52	234	618	228	18	28.0	90.0	24.0	0.0	1,42,000	5,560	246	48.8	4,582	488	5,324	780	512	48,10,000
NPB 750 x 270 x 173	173.00	221	762	267	14.4	21.6	90.0	17.0	0.0	2,05,800	6,873	305	55.7	5,402	515	6,218	810	274	93,90,000
NPB 750 x 270 x 174.54	174.54	222	760	270	14.4	21.6	90.0	17.0	0.0	2,06,000	7,100	304	56.5	5,430	526	6,240	827	272	96,50,000
NPB 750 x 270 x 185	185.00	236	766	267	14.9	23.6	90.0	17.0	0.0	2,23,000	7,510	308	56.5	5,821	563	6,691	884	337	1,03,00,000
NPB 750 x 270 x 196	196.00	251	770	268	15.6	25.4	90.0	17.0	0.0	2,40,300	8,175	310	57.1	6,241	610	7,174	959	408	1,13,00,000
NPB 750 x 270 x 202.49	202.49	257	770	270	15.6	26.6	90.0	17.0	0.0	2,49,000	8,750	311	58.2	6,480	648	7,430	1,010	450	1,20,00,000

Dimensional Tolerances will be conforming IS 12779 : 1989 (1995)



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- R_1 : Root radius

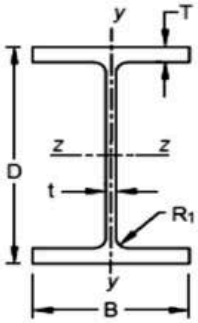
NEX
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Structurally Ahead

SAIL NEX STRUCTURALS (PFS-WPB)

Sectional Properties (Conforming to IS 808:2021), Wide Parallel Flange Beams (WPB)

Designation	Mass	Area	Dimensions					Properties											
WPB	M	A	D	B	t	T	FlangeSlope(α)	R1	R2	Izz	Iyy	rz	ry	Zzz	Zyy	Zpz	Zpy	It	Iw
	kg/m	Åx10² mm²	mm	mm	mm	mm	degrees	mm	mm	Åx10⁴ mm⁴	Åx10⁴ mm⁴	mm	mm	Åx10³ mm³	Åx10³ mm³	Åx10³ mm³	Åx10³ mm³	Åx10⁴ mm⁴	Åx10⁶ mm⁶
WPB 150 x 150 x 23.50	23.50	29.9	152	152	5.8	6.8	90.0	12.0	0.0	1,270	398	65.2	36.4	167	52.4	186	80.4	5.55	20,900
WPB 150 x 150 x 30.11	30.11	38.3	158	153	6.5	9.4	90.0	8.0	0.0	1,760	561	67.7	38.2	222	73.4	248	111	10.6	30,900
WPB 150 x 150 x 36.97	36.97	47.0	162	154	8.0	11.5	90.0	8.0	0.0	2,210	700	68.5	38.5	273	91.0	308	138	19.2	39,600
WPB 160 x 160 x 22.75	22.75	28.9	148	160	4.5	7.0	90.0	8.0	0.0	1,220	478	65.0	40.6	165	59.7	181	90.5	4.54	23,700
WPB 160 x 160 x 30.44	30.44	38.7	152	160	6.0	9.0	90.0	15.0	0.0	1,670	615	65.6	39.8	220	76.9	245	117	12.1	31,400
WPB 160 x 160 x 42.59	42.59	54.2	160	160	8.0	13.0	90.0	15.0	0.0	2,490	889	67.7	40.4	311	111	353	169	31.2	47,900
WPB 160 x 160 x 76.19	76.19	97.0	180	166	14.0	23.0	90.0	15.0	0.0	5,090	1,750	72.4	42.5	566	211	674	325	160	1,08,000
WPB 200 x 200 x 34.65	34.65	44.1	186	200	5.5	8.0	90.0	18.0	0.0	2,940	1,060	81.6	49.2	316	106	347	163	12.5	84,400
WPB 200 x 200 x 37.34	37.34	47.6	200	200	6.1	8.9	90.0	10.0	0.0	3,628	1,187	87.3	50.0	363	119	398	180	13.3	
WPB 200 x 200 x 42.26	42.26	53.8	190	200	6.5	10.0	90.0	18.0	0.0	3,690	1,330	82.8	49.8	388	133	429	203	21.0	1,08,000
WPB 200 x 200 x 50.92	50.92	64.8	194	202	8.0	12.0	90.0	18.0	0.0	4,530	1,650	83.5	50.4	467	163	521	249	34.3	1,36,000
WPB 200 x 200 x 61.30	61.30	78.0	200	200	9.0	15.0	90.0	18.0	0.0	5,690	2,000	85.4	50.6	569	200	642	305	59.7	1,71,000
WPB 240 x 240 x 47.40	47.40	60.3	224	240	6.5	9.0	90.0	21.0	0.0	5,830	2,070	98.3	58.6	520	173	570	264	22.1	2,39,000
WPB 240 x 240 x 60.32	60.32	76.8	230	240	7.5	12.0	90.0	21.0	0.0	7,760	2,760	100	60.0	675	230	744	351	42.1	3,28,000
WPB 240 x 240 x 83.20	83.20	105	240	240	10.0	17.0	90.0	21.0	0.0	11,200	3,920	103	60.8	938	326	1,050	498	103	4,86,000
WPB 240 x 240 x 156.68	156.68	199	270	248	18.0	32.0	90.0	21.0	0.0	24,200	8,150	110	63.9	1,790	657	2,110	1,000	626	11,50,000
WPB 300 x 300 x 69.80	69.80	88.9	283	300	7.5	10.5	90.0	27.0	0.0	13,800	4,730	124	72.9	975	315	1,060	482	47.8	8,77,000
WPB 300 x 300 x 88.34	88.34	112	290	300	8.5	14.0	90.0	27.0	0.0	18,200	6,300	127	74.8	1,250	420	1,380	641	87.8	11,90,000
WPB 300 x 300 x 100.85	100.85	128	294	300	10.0	16.0	90.0	27.0	0.0	21,000	7,210	128	74.9	1,430	480	1,580	733	124	13,90,000
WPB 300 x 300 x 117.03	117.03	149	300	300	11.0	19.0	90.0	27.0	0.0	25,100	8,560	129	75.7	1,670	570	1,860	870	189	16,80,000

Dimensional Tolerances will be conforming IS 12779 : 1989 (1995)



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- B : Flange Width
- T : Flange thickness
- t : Web thickness
- R_1 : Root radius

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SAIL NEX STRUCTURALS (PFS-WPB)

Sectional Properties (Conforming to IS 808:2021), Wide Parallel Flange Beams (WPB)

Designation	Mass	Area	Dimensions					Properties											
WPB	M	A	D	B	t	T	FlangeSlope(α)	R1	R2	Izz	Iyy	rz	ry	Zzz	Zyy	Zpz	Zpy	It	Iw
	kg/m	Ax10^2 mm^2	mm	mm	mm	mm	degrees	mm	mm	Ax10^4 mm^4	Ax10^4 mm^4	mm	mm	Ax10^3 mm^3	Ax10^3 mm^3	Ax10^3 mm^3	Ax10^3 mm^3	Ax10^4 mm^4	Ax10^6 mm^6
WPB 300 x 300 x 237.92	237.92	303	340	310	21.0	39.0	90.0	27.0	0.0	59,200	19,400	139	80.0	3,480	1,250	4,070	1,910	1,410	43,80,000
WPB 340 x 300 x 78.90	78.90	100	320	300	8.5	11.5	90.0	27.0	0.0	19,500	5,180	139	71.8	1,220	345	1,340	529	60.1	12,30,000
WPB 340 x 300 x 104.78	104.78	133	330	300	9.5	16.5	90.0	27.0	0.0	27,600	7,430	144	74.6	1,670	495	1,850	755	131	18,20,000
WPB 340 x 300 x 134.16	134.16	170	340	300	12.0	21.5	90.0	27.0	0.0	36,600	9,680	146	75.3	2,150	645	2,400	985	262	24,50,000
WPB 340 x 300 x 290.64	290.64	315	377	309	21.0	40.0	90.0	27.0	0.0	76,300	19,700	155	79.0	4,050	1,270	4,710	1,950	1,510	55,80,000
WPB 450 x 300 x 99.75	99.75	127	425	300	10.0	13.5	90.0	27.0	0.0	41,800	6,080	181	69.2	1,970	405	2,180	624	91.4	25,70,000
WPB 450 x 300 x 139.76	139.76	178	440	300	11.5	21.0	90.0	27.0	0.0	63,700	9,460	189	72.9	2,890	631	3,210	965	250	41,40,000
WPB 450 x 300 x 171.12	171.12	217	450	300	14.0	26.0	90.0	27.0	0.0	79,800	11,700	191	73.3	3,550	781	3,980	1,190	448	52,50,000
WPB 450 x 300 x 263.33	263.33	335	478	307	21.0	40.0	90.0	27.0	0.0	1,31,000	19,300	197	75.9	5,500	1,250	6,330	1,930	1,530	92,50,000

Dimensional Tolerances will be conforming IS 12779 : 1989 (1995)

PRODUCT RANGE

Conventional Structurals

Section	Weight(Kg/m)	Plant	Mill
Indian Standard Medium Beams (ISMB)			
MB 100 x 50	8.95	DSP	MSM
MB 150 x 75	14.96	DSP	MSM
MB 200 x 100	24.17	DSP	SM
MB 250 x 125	37.30	DSP	MSM
MB 300 x 140	46.02	DSP	MSM
Indian Standard Medium Channel (ISMC)			
MC 75 x 40	7.14	BSP	MM
MC 100 x 50	9.56	DSP/BSP	MSM
MC 125 x 65	13.10	DSP	MSM
MC 150 x 75	16.80	DSP	MSM/SM
MC 200 x 75	22.30	DSP	MSM/SM
MC 250 x 82	34.20	ISP	USM
MC 300 x 90	36.30	ISP/DSP	USM/MSM
MC 400 x 100	50.10	ISP	USM
Indian Standard Equal Angles (ISA)			
Angle 50 x 50 x 5/6	3.79 /4.49	BSP	MM
Angle 60 x 60 x 5/6/8	4.50/5.40/7.00	BSP	MM
Angle 65 x 65 x 5/6/8/10	4.98/5.91/7.73/9.49	BSP	MM
Angle 70 x 70 x 5/6	5.30/6.30	BSP	MM
Angle 75 x 75 x 5/6/8/10	5.77/6.86/9.00/11.07	BSP	MM
Angle 80 x 80 x 6/8/10	7.36/9.65/11.88/14.05	BSP	MM
Angle 90 x 90 x 6/8/10/12	8.32/10.92/13.47/15.95	DSP/BSP	MSM/MM
Angle 100 x 100 x 6/8/10/12	9.26/12.18/15.04/17.83	DSP	MSM
Angle 150 x 150 x 10/12	22.93/27.29	ISP	USM
Angle 200 x 200 x 12/16/18/20/25	36.85/48.53/54.3/59.96/73.90	ISP/DSP	USM/MSM**

**** New Section: Under Development**

Besides our plant rolled sections, we can also supply the following range through our **EPAs**.

Angle 45 mm to 150 mm

MC 75 x 40 mm to MC 400 x 100 mm

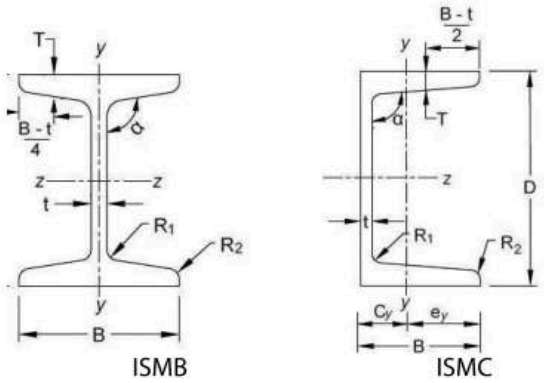
MB 100 mm to MB 600 mm

H Beams : 150 mm, 152 mm & 200 mm

Rail : 15 kg, 30 kg

Flats : 50 x 6 to 150 x 12 mm

Mild Steel Rounds



ISMB ISMC

SAIL STRUCTURALS

TAPERED FLANGE SECTIONS (TFS) FROM SAIL

Sectional Properties (Conforming to IS 808:2021), Indian Standard Medium Beams (ISMB)

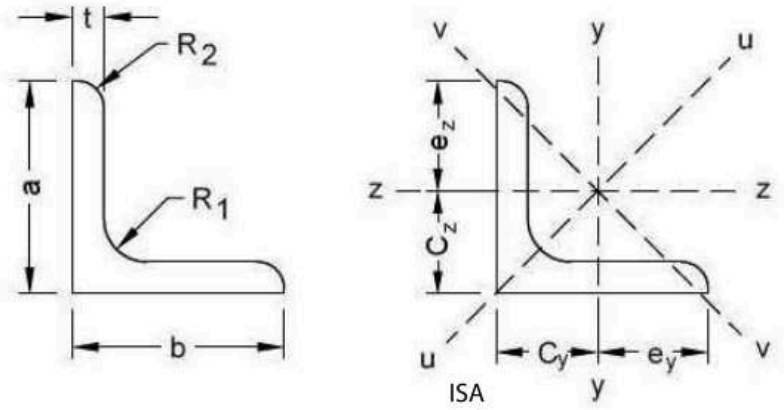
Designation	Mass	Area	Dimensions					Properties											
ISMB	M	A	D	B	t	T	FlangeSlope(α)	R1	R2	Izz	Iyy	rz	ry	Zzz	Zyy	Zpz	Zpy	It	Iw
	kg/m	Åx10² mm²	mm	mm	mm	mm	degrees	mm	mm	Åx10⁴ mm⁴	Åx10⁴ mm⁴	mm	mm	Åx10³ mm³	Åx10³ mm³	Åx10³ mm³	Åx10³ mm³	Åx10⁴ mm⁴	Åx10⁶ mm⁶
MB 100	8.95	11.4	100	50	4.7	7.0	98.0	9.0	4.5	182	12.5	39.9	10.4	36.4	5.01	42.6	8.58	2.15	315
MB 150	14.96	19.0	150	75	5.0	8.0	98.0	9.0	4.5	718	46.7	61.3	15.6	95.7	12.4	109	21.0	4.36	2,830
MB 250	37.30	47.5	250	125	6.9	12.5	98.0	13.0	6.5	5,130	334.0	103	26.5	410.0	53.5	465	89.7	25.5	57,300
MB 300	46.02	58.6	300	140	7.7	13.1	98.0	14.0	7.0	8,990	486.0	123	28.7	599.0	69.4	681	117	34.7	1,23,000

Dimensional Tolerances will be conforming IS 1852 : 1985

Sectional Properties (Conforming to IS 808:2021), Indian Standard Medium Channels (ISMC)

Designation	Mass	Area	Dimensions					Properties											
ISMC	M	A	D	B	t	T	Slope(α)	R_1	R_2	Cy	Izz	Iyy	rz	ry	Zzz	Zyy	Zpz	py	It	Iw
	kg/m	-10² mm²	mm	mm	mm	mm	degrees	mm	mm	mm	Åx10⁴ mm⁴	-10⁴ mm⁴	mm	mm	Åx10³ mm³	Åx10³ mm³	Åx10³ mm³	Åx10³ mm³	Åx10⁴ mm⁴	Åx10⁶ mm⁶
MC 100x50	9.56	12.1	100	50	5	7.7	96.0	9.0	2.4	15.4	191	26.3	39.7	14.7	38.4	7.60	45.2	14.8	2.25	512
MC 125x65	13.1	16.6	125	65	5.3	8.2	96.0	9.5	2.4	19.5	424	60.3	50.5	19.0	67.9	13.3	78.9	26.0	3.59	1,900
MC 150x75	16.8	21.3	150	75	5.7	9	96.0	10.0	2.4	22.0	786	102	60.8	21.9	104	19.3	121	38.1	5.45	4,700
MC 200x75	22.3	28.4	200	75	6.2	11.4	96.0	11.0	3.2	22.0	1,820	139	80.2	22.1	182	26.2	212	51.2	9.89	11,000
MC 250x82	34.2	43.4	250	82	9	14.1	96.0	12.0	3.2	22.3	4,060	242	96.8	2.36	325	40.7	386	78.7	22.8	30,600
MC 300x90	36.3	46.2	300	90	7.8	13.6	96.0	13.0	3.2	23.5	6,400	311	117	2.59	427	46.8	501	91.9	21.7	57,500
MC 400x100	50.1	63.7	400	100	8.8	15.3	96.0	15.0	4.8	24.2	15,100	504	154	2.81	758	66.5	898	129	36.1	1,70,000

Dimensional Tolerances will be conforming IS 1852 : 1985



SAIL STRUCTURALS
TAPERED FLANGE SECTIONS (TFS) FROM SAIL

Sectional Properties (Conforming to IS 808:2021), Indian Standard Equal Leg Angles (ISA)

Designation ISA	Mass	Area	Dimensions					Properties															
	M	A	D	B	t	R_1	R_2	Cy	Cz	tZZ	tyy	α	Iuu (max)	Ivv(min)	rZ	ry	ru	rv	Zz	Zy	Zpz	Zpy	It
	kg/m	-10^2 mm^2	mm	mm	mm	mm	mm	mm	mm	x10^4 mm^4	x10^4 mm^4	rad	x10^4 mm^4	x10^4 mm^4	mm	mm	mm	mm	10^3 mm^3	10^3 mm^3	10^3 mm^3	10^3 mm^3	10^4 mm^4
<90×90×6	8.32	10.6	90	90	6	8.5	0	24.5	24.5	83.0	83.0	0.79	131	34.2	28.0	28.0	35.3	18.0	12.7	12.7	22.8	22.8	1.25
<90×90×8	10.92	13.9	90	90	8	8.5	0	25.3	25.3	107	107	0.79	170	44.1	27.7	27.7	35.0	17.8	16.5	16.5	29.7	29.8	2.93
<90×90×10	13.47	17.1	90	90	10	8.5	0	26.0	26.0	129	129	0.79	205	53.6	27.5	27.5	34.6	17.7	20.2	20.2	36.4	36.5	5.66
<90×90×12	15.95	20.3	90	90	12	8.5	0	26.8	26.8	150	150	0.79	238	62.8	27.2	27.2	34.2	17.6	23.8	23.8	42.9	43.0	9.67
<100×100×6	9.26	11.8	100	100	6	8.5	0	27.0	27.0	115	115	0.79	182	47.2	31.2	31.2	39.4	200	15.7	15.7	28.3	28.3	1.39
<100×100×8	12.18	15.5	100	100	8	8.5	0	27.8	27.8	148	148	0.79	236	61	31	31	39	198	20.6	20.6	37	37.1	3.27
<100×100×10	15.04	19.1	100	100	10	8.5	0	28.5	28.5	180	180	0.79	286	74.3	30.7	30.7	38.7	197	25.3	25.3	45.4	45.5	6.33
<100×100×12	17.83	22.7	100	100	12	8.5	0	29.3	29.3	210	210	0.79	333	87.2	30.4	30.4	38.3	196	29.8	29.8	53.6	53.7	10.8
<150×150×10	22.93	29.2	150	150	10	12.0	4.8	40.8	40.8	633	633	0.79	1,000	259	46.6	46.6	58.7	298	58	58	104	104	9.66
<150×150×12	27.29	34.7	150	150	12	12.0	4.8	41.6	41.6	746	746	0.79	1,180	305	46.3	46.3	58.4	296	68.8	68.8	124	124	16.5
<200×200×12	36.85	46.9	200	200	12	15.0	4.8	53.9	53.9	1,820	1,820	0.79	2,900	746	62.4	62.4	78.7	399	125	125	225	225	22.3
<200×200×16	48.53	61.8	200	200	16	15.0	4.8	55.6	55.6	2,360	2,360	0.79	3,760	967	61.9	61.9	78	396	163	163	295	295	52.4
<200×200×20	59.96	76.3	200	200	20	15.0	4.8	57.1	57.1	2,870	2,870	0.79	4,560	1,180	61.3	61.3	77.3	393	201	201	362	363	101
<200×200×25	73.90	94.1	200	200	25	15.0	4.8	59.0	59.0	3,470	3,470	0.79	5,500	1,430	60.7	60.7	76.5	391	246	246	443	444	195

Dimensional Tolerances will be conforming IS 1852 : 1985

NEX
From SAIL
Structurally Ahead

Parallel Flange Sections (PFS) from SAIL's state-of-the-art mills at DSP (MSM) & ISP (USM) are branded as SAIL NEX

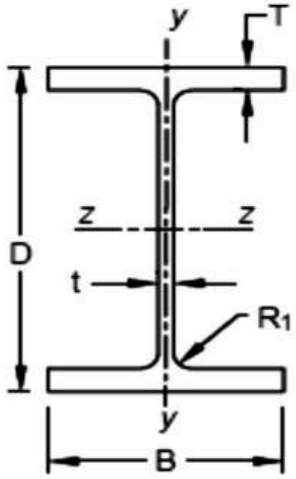
PFS are hot rolled steel structural sections, with parallel flanges having square toes and curves at the root of flange and web

PFS meet international standards of quality and stringent requirements of the infrastructure and construction industries

PFS and other structurals from New Mills of SAIL (DSP - MSM, & ISP - USM) are preferred by today's structural engineers, architects and construction companies

Parallel Flange Sections have multiple advantages over conventional sections

Higher product flexibility - Wide range of width, flange thickness and web thickness combinations for any nominal depth



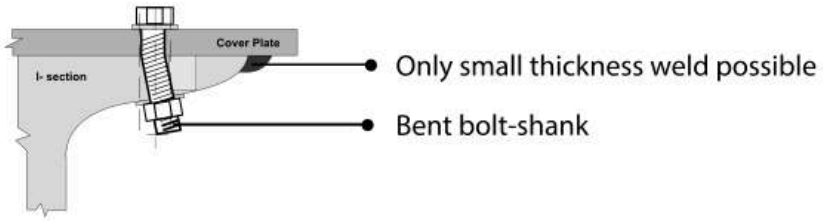
- D : Depth
- B : Flange Width
- T : Flange thickness
- t : Web thickness
- R_1 : Root radius

Mechanically more efficient - Higher bending strength for beams and higher axial load carrying capacity for columns

Structurally more stable - Greater radius of gyration lowers slenderness ration and allows withstanding of buckling to a greater extent

Lighter structures - Higher strength to-weight ratio leads to lighter structures and foundations

Easier fabrication - Easier connection of joints by direct bolting on flanges without using tapered washes and easier butt welding of plate at edge of flange



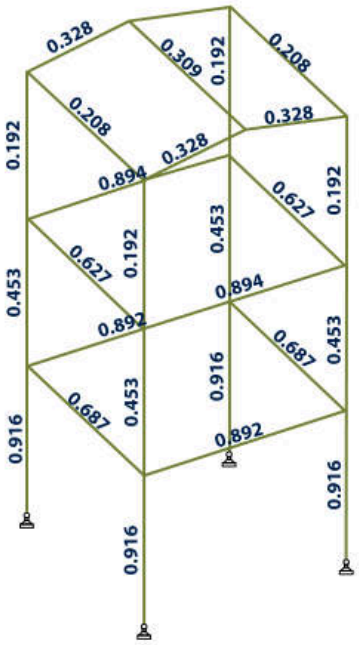
Economical - Substantial saving in material weight when used as compression member (columns) or flexural member (beams)

Type	Size	Weight Kg/m	Area (Sq.cm.)	Radius of Gyration (cm.)
ISMB	600x210	121.00	154	4.08
NPB	600x210	122.45	155	4.66
WPB	400x300	124.80	158	7.33

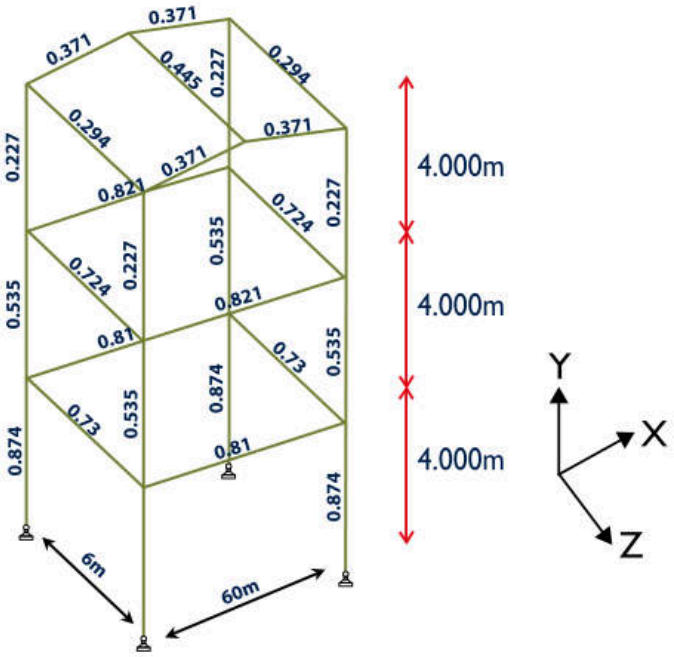
Section	Mass (Kg/m)	Section Modulus about major axis (cm^3)
ISMB 400	61.55	1020
NPB 400x180x57.38	57.38	1020

Parallel Flange Sections (PFS) are more efficient and provide more economic designs then Tapered Flange Sections (TFS) e.g. UTILISATION RATIO of sections.

Conventional (TFS)



SAIL NEX (PFS)



Max utilisation ratio of the Conventional section used:

Top Beams:	MB250 - 0.328
Mid Beams:	MB350 - 0.894
Lower Beams:	MB450 - 0.892
Columns:	MB600 - 0.916

Max utilisation ratio of the Paralel Flange section used:

Top Beams:	NPB250x30.11 - 0.371
Mid Beams:	NPB300x49.32 - 0.821
Lower Beams:	NPB400x66.31 - 0.81
Columns:	WPB240x83.2 - 0.874

The ratio of calculated design load on any structural member to its load-carrying capacity is known as UTILISATION RATIO which should normally be less than one

LOADING CONDITIONS

- Dead Load of 400 kg/m on floor beams & 100 kg/m on roof beams.
- Live Load of 1000 kg/m² on lower level floor beams & 600 kng/m² on mid level floor and 200 kg/m on roof beams.
- Wind Load of 300 kg/m on each column in both X & Z direction.
- Comparison of the weight of structure, for the above example, is given below:

Conventional Section	Weight in Tons
MB 600 x 123.0	5.79
MB 450 x 72.4	1.735
MB 350 x 52.4	1.254
MB 250 x 37.3	1.125
Total	9.904

Parallel Flange Section	Weight in Tons
WPB 240 x 83.20	3.985
WPB 400 x 66.31	1.588
WPB 300 x 49.32	1.181
NPB 250 x 30.11	0.906
Total	7.661

23% saving in weight is realised by using NEX Parallel Flange Sections insted of Conventional sections for the example shown

- Greater efficiency of the Parallel Flange Sections is primarily due to better distribution of material across the section. This leads to greater moment of inertia, section modulus and radius of gyration. Consequently PFS has more load carrying capacity.

ADVANTAGES OF USING HIGH TENSILE SECTIONS

- Lighter super structure
- Upfront savings in cost due to lesser weight of steel
- Reduced depth of beams
- Greater load carrying capacity for same depth of columns used in mild steel
- Lower transportation, handling and erection costs due to lower weight of structure

SAIL NEX AS ELECTRIC POLE (WPB 160)

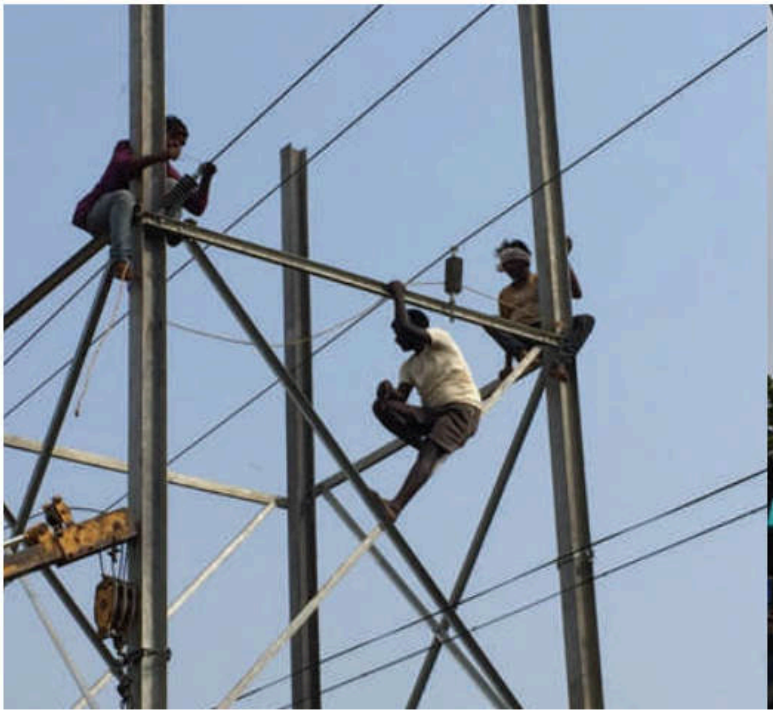
			Dimensions (mm)						
Section	Mass (Kg/m)	Sectional Area (cm^2)	D (Depth)	B (Width)	t (Web thick)	T (Flange thick)	Flange Slope, a deg	R_1 (Root Radius)	R_2
WPB 160	30.44	38.78	152	160	6	9	-	15	-

		Sectional Properties							
		Moment of Inertia		Radius of Gyration		Section Modulus		Plastic Section Modulus	
Section	Mass (Kg/m)	I_x (cm^4)	I_y (cm^4)	R_x (cm)	R_y (cm)	Z_x (cm^3)	Z_y (cm^3)	Z_{px} (cm^3)	Z_{px} (cm^3)
WPB 160x160	30.44	1670	615	6.56	3.98	220	76.9	245	117

Advantages of using SAIL NEX (WPB 160) as electric pole

1. Comparatively lighter steel member with higher section modulus
2. Saving in cost due to lower weight of steel member
3. Easier connection due to parallel flanges
4. Lower transportation, handling and erection cost owing to lighter members
5. Superior finish from state-of the-art mills
6. Supply in specific lengths as per requirement

SAIL NEX WPB 160 as ELECTRIC POLE
Installation by Tata Power Ltd. Odisha & WBSEDCL West Bengal





SAIL NEX WPB200 as steel sleepers for Railway bridges



Infrastructure support: WPB 200 & WPB 240 (SAIL NEX)

SAIL Steel Products have been an integral part of Infrastructure segment for decades. In its quest for producing efficient steel, SAIL developed Parallel Flange Sections which offer better sectional properties along with savings in weight and faster construction, thus improving the entire process cycle. These are branded as SAIL NEX and these sections are being used widely as an alternate to Conventional sections, which have tapered flanges.

SAIL, in its endeavour to support Indian Railways in reducing the nation's dependence on petroleum-based energy by rapid electrification of railway tracks, developed WPB 240 (47.4 kg/m) for use as OHE Mast in place of RSJ (8"x6") (52.1 kg/m) currently being used for Electrification. Northern railway has started using this for OHE Mast.

SAIL NEX sections are being supplied to various projects of Metros, DFCC, RVNL, IRCON etc. and can find application for masts too depending on the suitability of design as per RDSO.

Wide Flange Parallel Beam (WPB) 200 being supplied by SAIL has the approval of RDSO for making Steel Sleepers. Steel Sleepers impart higher strength in bearing the load of the rolling stock and thus improve the maintenance cycle, safety and overall operational efficiency.

RDSO has approved for adoption of SAIL NEX (Parallel Flange Sections - NPB/WPB) in designs for bridges where it fulfils the requirement of strength and serviceability.

WPB 200 & 240 can be utilized for many different areas depending on design and usage.

Some of the examples are:

Railways:

- Electric poles, Steel Sleepers for Railway Bridges.
- Railway Station development works & passenger shelters in stations.

Transport:

- Walkways/ Cross overs for urban roads and highways.
- Multilevel car parking in Airports, Railway & Bus Terminals, Business centers etc.

Construction Sector:

- Multi storied high rise residential & Commercial buildings.
- Buildings for commercial usage, Mini sports complex, Stadiums.
- Industrial sheds.

Applications of SAIL Structurals

- **Flyovers, Stadiums, Foot Over Bridges, Multi-level Car Parks**
- **Metro Rails, Indian Railways**
- **Industrial Buildings, Residential Complexes, Commercial Complexes**
- **Raw Material Handling Plants**
- **Power Plants, Ports, Offshore Structures**
- **Oil Refineries, Petrochemical Plants**
- **Electric Poles (Masts)**
- **Trailer and Truck Bed Frames**

NEX
From SAIL
Structurally Ahead

Some of our valued customers using SAIL Structurals





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स्टील अथॉरिटी ऑफ इण्डिया लिमिटेड
STEEL AUTHORITY OF INDIA LIMITED
There's a little bit of SAIL in everybody's life

Contad Sept 23