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APPENDICES

APPENDIX A

Statistics of Existing Round Steel Bars

No.	Diameter (mm)	Length (mm)	Supplier Product Code	Material Type	Volume (mm^3)	Weight (Kg)
1	270	510	SCM 440	MACHINERY 7225A	29185515	229.106
2	260	930	SCM 415	MACHINERY 7131	49351380	387.408
3	250	650	SCM 440	MACHINERY 7225A	31890625	250.341
4	250	650	SCM 440	MACHINERY 7225A	31890625	250.341
5	230	470	SCM 440	MACHINERY 7225A	19517455	153.212
6	225	470	SCM 440	MACHINERY 7225A	18678093.75	146.623
7	220	480	SCM 440	MACHINERY 7225A	18237120	143.161
8	220	470	SCM 440	MACHINERY 7225A	17857180	140.179
9	210	510	SCM 440	MACHINERY 7225A	17655435	138.595
10	190	1940	SCM 440	MACHINERY 7225A	54976690	431.567
11	190	910	D2	COLD WORK 2379	25788035	202.436
12	190	420	D2	COLD WORK 2379	11902170	93.432
13	190	420	D2	COLD WORK 2379	11902170	93.432
14	190	170	D2	COLD WORK 2379	4817545	37.818
15	180	1730	S45 C	CARBON 45	44000820	345.406
16	170	2400	SCM 440	MACHINERY 7225A	54447600	427.414
17	170	2200	SCM 440	MACHINERY 7225A	49910300	391.796
18	170	760	S45 C	CARBON 45	17241740	135.348
19	170	760	SCM 440	MACHINERY 7225A	17241740	135.348
20	170	760	SCM 440	MACHINERY 7225A	17241740	135.348
21	165	930	2344	HOT WORK 2344	19875611.25	156.024
22	165	830	DHA 1	HOT WORK 2344	17738448.75	139.247
23	160	2630	SCM 440	MACHINERY 7225A	52852480	414.892
24	160	2600	SCM 440	MACHINERY 7225A	52249600	410.159
25	160	1360	SCM 440	MACHINERY 7225A	27330560	214.545
26	160	1360	SCM 440	MACHINERY 7225A	27330560	214.545
27	160	500	SCM 415	MACHINERY 7131	10048000	78.877
28	160	500	SCM 415	MACHINERY 7131	10048000	78.877
29	155	1220	EC 80	MACHINERY 7131	23008742.5	180.619
30	155	690	EC 80	MACHINERY 7131	13013141.25	102.153
31	155	670	DHA 1	HOT WORK 2344	12635948.75	99.192
32	155	670	DHA 1	HOT WORK 2344	12635948.75	99.192
33	152	450	SKS 3	COLD WORK 2510	8161488	64.068
34	152	220	2379	COLD WORK 2379	3990060.8	31.322

35	150	1460	SCM 440	MACHINERY 7225A	25787250	202.430
36	150	1340	EC 80	MACHINERY 7131	23667750	185.792
37	150	980	SCM 440	MACHINERY 7225A	17309250	135.878
38	150	980	SCM 440	MACHINERY 7225A	17309250	135.878
39	150	910	D2	COLD WORK 2379	16072875	126.172
40	150	880	SUJ 2	MACHINERY 3505	15543000	122.013
41	150	770	SCM 415	MACHINERY 7131	13600125	106.761
42	145	630	DHA 1	HOT WORK 2344	10397913.75	81.624
43	142	830	D2	COLD WORK 2379	13137854.2	103.132
44	142	490	EC 80	MACHINERY 7131	7756082.6	60.885
45	140	1050	SCM 440	MACHINERY 7225A	16155300	126.819
46	140	1000	EC 80	MACHINERY 7131	15386000	120.780
47	140	1000	EC 80	MACHINERY 7131	15386000	120.780
48	140	800	S45 C	CARBON 45	12308800	96.624
49	140	560	EC 80	MACHINERY 7131	8616160	67.637
50	140	530	SCM 415	MACHINERY 7131	8154580	64.013
51	140	520	SCM 415	MACHINERY 7131	8000720	62.806
52	135	1080	EC 80	MACHINERY 7131	15451155	121.292
53	130	2270	S45 C	CARBON 45	30114955	236.402
54	130	910	EC 80	MACHINERY 7131	12072515	94.769
55	130	510	SUJ 2	MACHINERY 3505	6765915	53.112
56	120	3320	S45 C	CARBON 45	37529280	294.605
57	120	2350	SUJ 2	MACHINERY 3505	26564400	208.531
58	120	2300	DHA 1	HOT WORK 2344	25999200	204.094
59	120	1700	SCM 440	MACHINERY 7225A	19216800	150.852
60	120	1700	SCM 415	MACHINERY 7131	19216800	150.852
61	120	1700	SCM 415	MACHINERY 7131	19216800	150.852
62	120	1500	SCM 415	MACHINERY 7131	16956000	133.105
63	115	3740	SUJ 2	MACHINERY 3505	38827277.5	304.794
64	115	3310	EC 80	MACHINERY 7131	34363178.75	269.751
65	115	2800	EC 80	MACHINERY 7131	29068550	228.188
66	115	2700	EC 80	MACHINERY 7131	28030387.5	220.039
67	115	630	2344	HOT WORK 2344	6540423.75	51.342
68	115	600	SUJ 2	MACHINERY 3505	6228975	48.897
69	115	510	DC 53	COLD WORK 2379	5294628.75	41.563
70	115	510	DC 53	COLD WORK 2379	5294628.75	41.563
71	111	2000	D2	COLD WORK 2379	19343970	151.850
72	110	6000	SCM 415	MACHINERY 7131	56991000	447.379
73	110	3100	SCM 415	MACHINERY 7131	29445350	231.146
74	110	3050	SCM 415	MACHINERY 7131	28970425	227.418
75	110	2000	D2	COLD WORK 2379	18997000	149.126
76	110	1880	SUJ 2	MACHINERY 3505	17857180	140.179
77	110	1480	SCM 415	MACHINERY 7131	14057780	110.354
78	110	1470	SCM 415	MACHINERY 7131	13962795	109.608
79	110	1420	SCM 415	MACHINERY 7131	13487870	105.880
80	110	1340	SCM 415	MACHINERY 7131	12727990	99.915
81	110	1340	SCM 415	MACHINERY 7131	12727990	99.915

82	110	930	D2	COLD WORK 2379	8833605	69.344
83	110	270	SKS 3	COLD WORK 2510	2564595	20.132
84	105	4530	EC 80	MACHINERY 7131	39205451.25	307.763
85	105	4500	EC 80	MACHINERY 7131	38945812.5	305.725
86	105	3200	EC 80	MACHINERY 7131	27694800	217.404
87	105	2700	SCM 440	MACHINERY 7225A	23367487.5	183.435
88	105	2260	EC 80	MACHINERY 7131	19559452.5	153.542
89	105	2000	EC 80	MACHINERY 7131	17309250	135.878
90	105	1490	SCM 440	MACHINERY 7225A	12895391.25	101.229
91	105	1450	SCM 440	MACHINERY 7225A	12549206.25	98.511
92	105	1200	SCM 415	MACHINERY 7131	10385550	81.527
93	105	1150	MO 40	MACHINERY 7225	9952818.75	78.130
94	105	490	D2	COLD WORK 2379	4240766.25	33.290
95	102	630	SCM 440	MACHINERY 7225A	5145298.2	40.391
96	102	620	SCM 440	MACHINERY 7225A	5063626.8	39.749
97	100	6000	SCM 440	MACHINERY 7225A	47100000	369.735
98	100	5200	SCM 440	MACHINERY 7225A	40820000	320.437
99	100	2400	SCM 415	MACHINERY 7131	18840000	147.894
100	100	2050	SCM 415	MACHINERY 7131	16092500	126.326
101	100	1100	DHA 1	HOT WORK 2344	8635000	67.785
102	100	830	SUJ 2	MACHINERY 3505	6515500	51.147
103	100	830	EC 80	MACHINERY 7131	6515500	51.147
104	100	600	SCM 440	MACHINERY 7225A	4710000	36.974
105	95	2630	DHA 1	HOT WORK 2344	18632563.75	146.266
106	95	2600	DHA 1	HOT WORK 2344	18420025	144.597
107	95	2400	SCM 440	MACHINERY 7225A	17003100	133.474
108	95	1100	SCM 415	MACHINERY 7131	7793087.5	61.176
109	95	1100	SCM 415	MACHINERY 7131	7793087.5	61.176
110	95	580	SCM 440	MACHINERY 7225A	4109082.5	32.256
111	95	540	2379	COLD WORK 2379	3825697.5	30.032
112	95	540	2379	COLD WORK 2379	3825697.5	30.032
113	90	2000	SKS 3	COLD WORK 2510	12717000	99.828
114	90	1880	S45 C	CARBON 45	11953980	93.839
115	90	420	2379	COLD WORK 2379	2670570	20.964
116	90	390	SKS 3	COLD WORK 2510	2479815	19.467
117	87	2000	SKS 3	COLD WORK 2510	11883330	93.284
118	86	1320	440 C	STAINLESS 4125	7663735.2	60.160
119	86	1110	D2	COLD WORK 2379	6444504.6	50.589
120	86	670	SKS 3	COLD WORK 2510	3889926.2	30.536
121	85	4900	SUJ 2	MACHINERY 3505	27790962.5	218.159
122	85	3700	SCM 415	MACHINERY 7131	20985012.5	164.732
123	85	2840	SCM 415	MACHINERY 7131	16107415	126.443
124	85	2700	S45 C	CARBON 45	15313387.5	120.210

125	85	2700	S45 C	CARBON 45	15313387.5	120.210
126	85	2090	MO 40	MACHINERY 7225	11853696.25	93.052
127	85	1890	S45 C	CARBON 45	10719371.25	84.147
128	85	1370	S45 C	CARBON 45	7770126.25	60.995
129	85	1250	S45 C	CARBON 45	7089531.25	55.653
130	85	1180	D2	COLD WORK 2379	6692517.5	52.536
131	85	1050	EC 80	MACHINERY 7131	5955206.25	46.748
132	85	1050	EC 80	MACHINERY 7131	5955206.25	46.748
133	85	680	SCM 440	MACHINERY 7225A	3856705	30.275
134	85	670	SKS 3	COLD WORK 2510	3799988.75	29.830
135	80	3700	SCM 415	MACHINERY 7131	18588800	145.922
136	80	2720	SCM 415	MACHINERY 7131	13665280	107.272
137	80	2500	SCM 440	MACHINERY 7225A	12560000	98.596
138	80	2500	SCM 440	MACHINERY 7225A	12560000	98.596
139	80	1300	SCM 440	MACHINERY 7225A	6531200	51.270
140	80	950	S45 C	CARBON 45	4772800	37.466
141	80	870	SCM 440	MACHINERY 7225A	4370880	34.311
142	80	830	SCM 440	MACHINERY 7225A	4169920	32.734
143	80	740	SCM 440	MACHINERY 7225A	3717760	29.184
144	77	1300	SCM 440	MACHINERY 7225A	6050544.5	47.497
145	77	1100	SCM 440	MACHINERY 7225A	5119691.5	40.190
146	77	310	2379	COLD WORK 2379	1442822.15	11.326
147	76	920	DC 53	COLD WORK 2379	4171427.2	32.746
148	76	530	DC 53	COLD WORK 2379	2403104.8	18.864
149	75	3400	SCM 415	MACHINERY 7131	15013125	117.853
150	75	3390	SCM 415	MACHINERY 7131	14968968.75	117.506
151	75	3300	SCM 415	MACHINERY 7131	14571562.5	114.387
152	75	3200	SCM 415	MACHINERY 7131	14130000	110.921
153	75	3100	EC 80	MACHINERY 7131	13688437.5	107.454
154	75	3040	MO 40	MACHINERY 7225	13423500	105.374
155	75	2500	SCM 415	MACHINERY 7131	11039062.5	86.657
156	75	2490	DHA 1	HOT WORK 2344	10994906.25	86.310
157	75	2480	S45 C	CARBON 45	10950750	85.963
158	75	1980	DHA 1	HOT WORK 2344	8742937.5	68.632
159	75	1900	DHA 1	HOT WORK 2344	8389687.5	65.859
160	75	1530	MO 40	MACHINERY 7225	6755906.25	53.034
161	75	1500	SCM 440	MACHINERY 7225A	6623437.5	51.994
162	75	1470	SKS 3	COLD WORK 2510	6490968.75	50.954
163	75	1100	SCM 440	MACHINERY 7225A	4857187.5	38.129
164	75	920	DC 53	COLD WORK 2379	4062375	31.890
165	75	540	DC 53	COLD WORK 2379	2384437.5	18.718
166	75	400	SKS 3	COLD WORK 2510	1766250	13.865

167	72	3350	MO 40	MACHINERY 7225	13632624	107.016
168	72	3350	MO 40	MACHINERY 7225	13632624	107.016
169	72	3350	MO 40	MACHINERY 7225	13632624	107.016
170	72	1960	SCM 440	MACHINERY 7225A	7976102.4	62.612
171	70	6000	SCM 440	MACHINERY 7225A	23079000	181.170
172	70	6000	SCM 415	MACHINERY 7131	23079000	181.170
173	70	3000	SUJ 2	MACHINERY 3505	11539500	90.585
174	70	2220	SCM 415	MACHINERY 7131	8539230	67.033
175	70	2200	SCM 440	MACHINERY 7225A	8462300	66.429
176	70	2200	SCM 440	MACHINERY 7225A	8462300	66.429
177	70	1920	SCM 415	MACHINERY 7131	7385280	57.974
178	70	1900	EC 80	MACHINERY 7131	7308350	57.371
179	70	1900	SCM 415	MACHINERY 7131	7308350	57.371
180	70	1600	EC 80	MACHINERY 7131	6154400	48.312
181	70	1530	SKS 3	COLD WORK 2510	5885145	46.198
182	70	1500	SKS 3	COLD WORK 2510	5769750	45.293
183	70	1500	EC 80	MACHINERY 7131	5769750	45.293
184	70	1100	MO 40	MACHINERY 7225	4231150	33.215
185	70	550	S45 C	CARBON 45	2115575	16.607
186	68	1180	SKS 3	COLD WORK 2510	4283211.2	33.623
187	65	6000	SCM 415	MACHINERY 7131	19899750	156.213
188	65	4900	DHA 1	HOT WORK 2344	16251462.5	127.574
189	65	3000	SCM 415	MACHINERY 7131	9949875	78.107
190	65	2050	SUJ 2	MACHINERY 3505	6799081.25	53.373
191	65	2000	SCM 415	MACHINERY 7131	6633250	52.071
192	65	1960	DHA 1	HOT WORK 2344	6500585	51.030
193	65	1870	MO 40	MACHINERY 7225	6202088.75	48.686
194	65	1480	EC 80	MACHINERY 7131	4908605	38.533
195	65	1130	440 C	STAINLESS 4125	3747786.25	29.420
196	65	1100	EC 80	MACHINERY 7131	3648287.5	28.639
197	65	990	EC 80	MACHINERY 7131	3283458.75	25.775
198	65	640	SCM 415	MACHINERY 7131	2122640	16.663
199	65	530	SUJ 2	MACHINERY 3505	1757811.25	13.799
200	61	260	D2	COLD WORK 2379	759456.1	5.962
201	60	5400	EC 80	MACHINERY 7131	15260400	119.794
202	60	3230	SUJ 2	MACHINERY 3505	9127980	71.655
203	60	3000	EC 80	MACHINERY 7131	8478000	66.552
204	60	2300	SCM 440	MACHINERY 7225A	6499800	51.023
205	60	2300	SCM 440	MACHINERY 7225A	6499800	51.023
206	60	2300	SCM 440	MACHINERY 7225A	6499800	51.023
207	60	2000	D2	COLD WORK 2379	5652000	44.368
208	60	1960	SCM 440	MACHINERY 7225A	5538960	43.481
209	60	1850	SCM 440	MACHINERY 7225A	5228100	41.041
210	60	1380	SCM 415	MACHINERY 7131	3899880	30.614

211	60	1130	SKS 3	COLD WORK 2510	3193380	25.068
212	60	1120	SKS 3	COLD WORK 2510	3165120	24.846
213	60	1110	8550	CARBON 45	3136860	24.624
214	60	1000	SCM 415	MACHINERY 7131	2826000	22.184
215	60	760	MO 40	MACHINERY 7225	2147760	16.860
216	60	570	SUJ 2	MACHINERY 3505	1610820	12.645
217	58	1800	SCM 415	MACHINERY 7131	4753332	37.314
218	56	1500	D2	COLD WORK 2379	3692640	28.987
219	55	4000	SCM 415	MACHINERY 7131	9498500	74.563
220	55	3000	SUJ 2	MACHINERY 3505	7123875	55.922
221	55	3000	SCM 415	MACHINERY 7131	7123875	55.922
222	55	2460	SUJ 2	MACHINERY 3505	5841577.5	45.856
223	55	1890	EC 80	MACHINERY 7131	4488041.25	35.231
224	55	1800	EC 80	MACHINERY 7131	4274325	33.553
225	55	1230	D2	COLD WORK 2379	2920788.75	22.928
226	55	1230	D2	COLD WORK 2379	2920788.75	22.928
227	55	860	SKS 3	COLD WORK 2510	2042177.5	16.031
228	50	2000	EC 80	MACHINERY 7131	3925000	30.811
229	50	1500	SKS 3	COLD WORK 2510	2943750	23.108
230	50	1380	D2	COLD WORK 2379	2708250	21.260
231	50	960	DHA 1	HOT WORK 2344	1884000	14.789
232	48	1970	SCM 415	MACHINERY 7131	3563020.8	27.970
233	48	1700	EC 80	MACHINERY 7131	3074688	24.136
234	46	2600	D2	COLD WORK 2379	4318756	33.902
235	45	3500	D2	COLD WORK 2379	5563687.5	43.675
236	45	2100	SKS 3	COLD WORK 2510	3338212.5	26.205
237	45	1500	SKS 3	COLD WORK 2510	2384437.5	18.718
238	42	2800	SKS 3	COLD WORK 2510	3877272	30.437
239	42	970	2379	COLD WORK 2379	1343197.8	10.544
240	42	255	SKS 3	COLD WORK 2510	353108.7	2.772
241	40	2800	SKS 3	COLD WORK 2510	3516800	27.607
242	40	1800	D2	COLD WORK 2379	2260800	17.747
243	38	2000	SKS 3	COLD WORK 2510	2267080	17.797
244	38	570	SKS 3	COLD WORK 2510	646117.8	5.072
245	36	2600	D2	COLD WORK 2379	2645136	20.764
246	35	2900	SKS 3	COLD WORK 2510	2788712.5	21.891
247	35	2500	SKS 3	COLD WORK 2510	2404062.5	18.872
248	35	2010	3343	HIGH SPEED	1932866.25	15.173
249	33	1500	440 C	STAINLESS 4125	1282297.5	10.066
250	33	1300	440 C	STAINLESS 4125	1111324.5	8.724
251	32	3500	440 C	STAINLESS 4125	2813440	22.086
252	32	3400	SKS 3	COLD WORK 2510	2733056	21.454
253	32	1500	SKS 3	COLD WORK 2510	1205760	9.465
254	32	1320	3343	HIGH SPEED	1061068.8	8.329
255	31	3700	D2	COLD WORK 2379	2791224.5	21.911
256	30	2500	440 C	STAINLESS 4125	1766250	13.865
257	26	3500	D2	COLD WORK 2379	1857310	14.580
258	26	1500	D2	COLD WORK 2379	795990	6.249
259	25	5800	SKS 3	COLD WORK 2510	2845625	22.338
260	25	5800	SKS 3	COLD WORK 2510	2845625	22.338

261	25	3300	440 C	STAINLESS 4125	1619062.5	12.710
262	25	1280	SKS 3	COLD WORK 2510	628000	4.930
263	25	128	SKS 3	COLD WORK 2510	62800	0.493
264	22	1800	SKS 3	COLD WORK 2510	683892	5.369
265	21	4280	SKS 3	COLD WORK 2510	1481671.8	11.631
266	21	3600	D2	COLD WORK 2379	1246266	9.783
267	21	3600	D2	COLD WORK 2379	1246266	9.783
268	21	1700	D2	COLD WORK 2379	588514.5	4.620
269	20	4600	SKS 3	COLD WORK 2510	1444400	11.339
270	20	3600	440 C	STAINLESS 4125	1130400	8.874
271	19	5800	SKS 3	COLD WORK 2510	1643633	12.903
272	19	3400	D2	COLD WORK 2379	963509	7.564
273	19	2000	SKS 3	COLD WORK 2510	566770	4.449
274	19	2000	SKS 3	COLD WORK 2510	566770	4.449
275	19	2000	SKS 3	COLD WORK 2510	566770	4.449
276	19	418	SKS 3	COLD WORK 2510	118454.93	0.930
277	19	418	SKS 3	COLD WORK 2510	118454.93	0.930
278	19	179	SKS 3	COLD WORK 2510	50725.915	0.398
279	18	5800	SKS 3	COLD WORK 2510	1475172	11.580
280	18	2000	SKS 3	COLD WORK 2510	508680	3.993
281	18	1550	SKS 3	COLD WORK 2510	394227	3.095
282	18	418	SKS 3	COLD WORK 2510	106314.12	0.835
283	16	2370	SKS 3	COLD WORK 2510	476275.2	3.739
284	16	2240	SKS 3	COLD WORK 2510	450150.4	3.534
285	16	2000	SKS 3	COLD WORK 2510	401920	3.155
286	16	2000	SKS 3	COLD WORK 2510	401920	3.155
287	16	1580	2379	COLD WORK 2379	317516.8	2.493
288	16	418	SKS 3	COLD WORK 2510	84001.28	0.659
289	15	4100	SKS 3	COLD WORK 2510	724162.5	5.685
290	15	620	S45 C	CARBON 45	109507.5	0.860
291	12	2000	SKS 3	COLD WORK 2510	226080	1.775
292	12	2000	SKS 3	COLD WORK 2510	226080	1.775
293	12	2000	SKS 3	COLD WORK 2510	226080	1.775
294	12	2000	SKS 3	COLD WORK 2510	226080	1.775
295	12	2000	SKS 3	COLD WORK 2510	226080	1.775
296	10	950	SKS 3	COLD WORK 2510	74575	0.585
297	9	2000	SKS 3	COLD WORK 2510	127170	0.998
298	9	2000	SKS 3	COLD WORK 2510	127170	0.998
299	9	2000	SKS 3	COLD WORK 2510	127170	0.998
300	9	2000	SKS 3	COLD WORK 2510	127170	0.998
301	6	2000	SKS 3	COLD WORK 2510	56520	0.444
302	6	2000	SKS 3	COLD WORK 2510	56520	0.444
Total						24992.795

APPENDIX B

Statistics of Existing Flat Steel Bars

No.	Length (mm)	Width (mm)	Height (mm)	Supplier Product Code	Material Type	Volume (mm^3)	Weight (Kg)
1	4900	185	25	GOA	MACHINERY 3505	22662500	177.901
2	3300	65	10	2379	COLD WORK 2379	2145000	16.838
3	3000	188	25	S45 C	CARBON 45	14100000	110.685
4	3000	205	32	GOA	MACHINERY 3505	19680000	154.488
5	2900	25	25	S45 C	CARBON 45	1812500	14.228
6	2900	25	25	S45 C	CARBON 45	1812500	14.228
7	2900	25	25	S45 C	CARBON 45	1812500	14.228
8	2850	155	25	S45 C	CARBON 45	11043750	86.693
9	2800	32	32	S45 C	CARBON 45	2867200	22.508
10	2800	32	32	S45 C	CARBON 45	2867200	22.508
11	2780	107	10	DC 53	COLD WORK 2379	2974600	23.351
12	2700	210	26	2379	COLD WORK 2379	14742000	115.725
13	2700	205	16	DC 53	COLD WORK 2379	8856000	69.520
14	2600	50	13	S45 C	CARBON 45	1690000	13.267
15	2500	250	50	S45 C	CARBON 45	31250000	245.313
16	2300	155	32	S45 C	CARBON 45	11408000	89.553
17	2300	155	32	S45 C	CARBON 45	11408000	89.553
18	2300	80	30	2379	COLD WORK 2379	5520000	43.332
19	2300	185	18	GOA	MACHINERY 3505	7659000	60.123
20	2250	107	12	D2	COLD WORK 2379	2889000	22.679
21	2250	107	12	D2	COLD WORK 2379	2889000	22.679
22	2200	185	38	S45 C	CARBON 45	15466000	121.408
23	2000	105	25	S45 C	CARBON 45	5250000	41.213
24	2000	75	13	S45 C	CARBON 45	1950000	15.308
25	1810	305	13	S45 C	CARBON 45	7176650	56.337
26	1800	105	65	S45 C	CARBON 45	12285000	96.437
27	1600	50	13	S45 C	CARBON 45	1040000	8.164
28	1600	66	6	DC 53	COLD WORK 2379	633600	4.974
29	1500	105	6	S45 C	CARBON 45	945000	7.418
30	1420	150	25	S45 C	CARBON 45	5325000	41.801
31	1400	130	25	S45 C	CARBON 45	4550000	35.718
32	1400	50	13	S45 C	CARBON 45	910000	7.144
33	1370	130	25	GOA	MACHINERY 3505	4452500	34.952
34	1360	155	13	S45 C	CARBON 45	2740400	21.512
35	1300	105	6	S45 C	CARBON 45	819000	6.429
36	1100	130	25	S45 C	CARBON 45	3575000	28.064
37	1100	90	10	2379	COLD	990000	7.772

					WORK 2379		
38	1080	77	40	DC 53	COLD WORK 2379	3326400	26.112
39	990	310	9	S45 C	CARBON 45	2762100	21.682
40	970	85	19	SCM 440	MACHINERY 7225A	1566550	12.297
41	810	205	25	S45 C	CARBON 45	4151250	32.587
42	710	150	65	SCM 440	MACHINERY 7225A	6922500	54.342
43	710	150	65	SCM 440	MACHINERY 7225A	6922500	54.342
44	660	105	10	S45 C	CARBON 45	693000	5.440
45	640	105	19	S45 C	CARBON 45	1276800	10.023
46	580	305	45	S45 C	CARBON 45	7960500	62.490
47	550	145	60	S45 C	CARBON 45	4785000	37.562
48	530	205	38	S45 C	CARBON 45	4128700	32.410
49	520	260	46	GOA	MACHINERY 3505	6219200	48.821
50	490	105	25	S45 C	CARBON 45	1286250	10.097
51	470	185	38	S45 C	CARBON 45	3304100	25.937
52	460	39	32	S45 C	CARBON 45	574080	4.507
53	450	98	32	SCM 440	MACHINERY 7225A	1411200	11.078
54	370	370	32	SCM 440	MACHINERY 7225A	4380800	34.389
Total							2448.162

APPENDIX C

Order Amount of Round Steel Bar in the Past Two Years

2004 / Materials Type	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Subtotal
COLD WORK 2379	5	8	7	4	7	3	7	5	10	11	8	10	85
COLD WORK 2510	8	4	9	9	6	6	5	6	5	6	4	6	74
HIGH SPEED	2	1	2	1	3	2	3	2	2	3	1	2	24
HOT WORK 2344	3	3	4	5	4	3	6	3	2	1	3	5	42
MACHINERY 7225A	9	10	10	6	5	4	11	4	6	7	5	4	81
MACHINERY 7225	5	4	6	3	3	4	2	1	2	3	2	2	37
MACHINERY 7131	10	15	13	9	7	12	12	6	5	9	11	14	123
MACHINERY 3505	2	2	5	4	6	7	3	4	5	3	5	6	52
STAINLESS 4125	2	1	3	2	3	3	2	3	4	4	2	3	32
CARBON 45	2	3	3	5	1	4	6	2	4	3	3	1	37
Subtotal	48	51	62	48	45	48	57	36	45	50	44	53	587

2005 / Materials Type	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Subtotal
COLD WORK 2379	8	9	9	9	7	5	4	6	4	10	7	7	85
COLD WORK 2510	8	6	7	6	7	9	3	7	4	8	4	5	74
HIGH SPEED	2	4	2	1	1	2	3	4	2	1	1	3	26
HOT WORK 2344	3	4	3	5	3	2	5	3	6	7	1	2	44
MACHINERY 7225A	10	7	6	5	9	8	7	7	5	6	7	10	87
MACHINERY 7225	5	3	2	5	2	3	4	3	6	4	2	3	42
MACHINERY 7131	8	6	10	6	7	9	13	7	3	2	3	2	76
MACHINERY 3505	2	2	3	4	5	7	8	3	6	8	6	1	55
STAINLESS 4125	3	4	2	2	3	2	2	1	4	2	3	2	30
CARBON 45	1	2	3	4	1	3	2	2	3	4	3	1	29
Subtotal	50	47	47	47	45	50	51	43	43	52	37	36	548

APPENDIX D

Order Amount of Flat Steel Bar in the Past Two Years

2004 / Materials Type	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Subtotal
COLD WORK 2379	4	6	6	4	5	6	8	10	6	5	4	7	71
MACHINERY 7225A	5	3	2	3	4	5	4	3	3	3	2	5	42
MACHINERY 3505	2	2	5	4	6	5	3	6	4	2	4	3	46
CARBON 45	10	15	12	12	14	17	12	10	11	11	14	15	153
Subtotal	21	26	25	23	29	33	27	29	24	21	24	30	312

2005 / Materials Type	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Subtotal
COLD WORK 2379	4	3	2	5	4	5	6	7	4	7	5	8	60
MACHINERY 7225A	2	3	5	2	3	5	3	4	3	4	5	7	46
MACHINERY 3505	3	2	2	5	4	2	1	5	3	4	5	5	41
CARBON 45	11	13	12	12	13	12	13	12	14	11	14	15	152
Subtotal	20	21	21	24	24	24	23	28	24	26	29	35	299

APPENDIX E

Warehouse Safety Checklist

DATE: _____ INSPECTOR: _____

ITEMS		RESULT		REMARK
		YES	NO	
Aisle	Clean			
	No Stock			
Storage and Handling Equipment	Good Condition			
	Adequate			
Management	New and Old Employees Training			
	Warning Signs Post			
	Correct Safe Operating			
	First Aid Equipment Available			
	Fire extinguishers Accessible			

Comments: _____

_____

_____

_____

Completed by: _____ Date: _____

BIOGRAPHY

Hui Ye was born on October 1st, 1981 in Shanghai, China. He graduated from University of Shanghai for Science and Technology with the Bachelor's degree in Mechanical Engineering in June, 2004. Afterwards, the aspiration for acquiring the managerial skills and knowledge in the engineering field propelled him to further his graduate study as a full time student in the program of Master of Engineering Management jointly offered by Chulalongkorn University and University of Warwick at the Regional Centre for Manufacturing Systems Engineering, Faculty of Engineering, Chulalongkorn University, Thailand, from October, 2005 to March, 2007.