Online Supplement Material

I. Group-based mathematical formulation

The group-based formulation is adapted from the pattern or group-based formulation (Lübbecke & Zimmermann (2003) and Wang & Tang (2007)). By adding to the principle of group generation, the adapted model differs from the previous ones in terms of its objective function and the operation time window constraints for requests in a group. The latter is caused by a variation of the locomotive capacity for transporting requests of different types. The new notions used in this formulation are introduced, as follows.

Let $g \in \mathcal{G}$ denote a group of requests (of one request or more) that can be transported together by a locomotive. $\mathcal{G}$ is the set of all feasible groups and includes four subsets, $\mathcal{G}_m$, where $m \in M$ and $M = \{1, 2, 3, 4\}$. The subscript m indicates the number of requests included in an element of the related group set. Evidently, if a group g contains three or four requests, then $\forall r \in g, r \in \mathcal{R}_E$. Each request $r \in \mathcal{R}$ is assigned a group set $\mathcal{G}^r$ with every element containing r. A feasible group must satisfy the condition that a locomotive exists, such that it can execute all pickup and delivery operations without violating the time window constraints. Furthermore, the capacity constraints, the incompatibility constraints, and the LIFO rule should be satisfied by each group. Each group $g \in \mathcal{G}$ is associated with a set ϑ_g^+ (ϑ_g^-), where the element in ϑ_g^+ (ϑ_g^-) is the request group or the locomotive origin (or destination), which can be a feasible predecessor (or successor) of g. Incidentally, the successor (predecessor) set of ℓ^+ (ℓ^-) is $\vartheta_{\ell^+}^-$ ($\vartheta_{\ell^-}^+$). The service time of the *ith* operation (pickup or delivery) in group g is denoted by s_{g_i}. Let $[e_{g_i}, l_{g_i}]$ be the time window of the *ith* operation in group g.

Note that the sum of the travel time between the ordered pickup and the delivery locations of group g is a constant, D_g. Hence, a route consisting of groups can be converted into a route in graph G. Therefore, the calculation of the molten iron waiting time is the same as in the three-index formulation. Considering the service start time of a group of requests (BA→RS), once the visiting time of the delivery locations are known, the total molten iron waiting time of this group can be calculated using equation (**??**), as described in Section 3. Here, $W(T_{g_1})$ is the molten iron waiting time of group g, where T_{g_1} is the service start time of g, which determines the visiting time of the delivery locations.

The decision variables used in the group-based formulation are as follows:

T_{g_i}: the service start time of the *ith* operation in group g;
$x_{gd}^{\ell} \in \{0, 1\}$: equals 1 if ℓ visits group g and group d successively and 0, otherwise;
$x_{\ell^+ g}^{\ell} \in \{0, 1\}$: equals 1 if g is the first group visited by ℓ and 0, otherwise;
$x_{g\ell^-}^{\ell} \in \{0, 1\}$: equals 1 if g is the last group visited by ℓ and 0, otherwise;
$W(T_{g_1})$: the total molten iron waiting time of group g with respect to its service start time T_{g_1}.

The group-based formulation is then obtained as follows.

$$min \sum_{\ell \in \mathcal{L}} \sum_{r \in \mathcal{R}_{L_1}} \sum_{g \in \mathcal{G}^r} \sum_{d \in \vartheta_g^-} x_{gd}^{\ell} W(T_{g_1}) + \sum_{\ell \in \mathcal{L}} \sum_{g \in \mathcal{G}} \sum_{d \in \vartheta_g^-} x_{gd}^{\ell} D_g + \sum_{\ell \in \mathcal{L}} \sum_{g \in \mathcal{G} \cup \ell^+} \sum_{d \in \mathcal{G} \cup \ell^-} x_{gd}^{\ell} t_{gd} \tag{1}$$

$$s.t. \sum_{g \in \mathcal{G} \cup \ell^-} x_{\ell^+ g}^{\ell} = \sum_{g \in \mathcal{G} \cup \ell^+} x_{g\ell^-}^{\ell} = 1, \forall \ell \in \mathcal{L} \tag{2}$$

$$\sum_{d \in \vartheta_g^+} x_{dg}^{\ell} - \sum_{d \in \vartheta_g^-} x_{gd}^{\ell} = 0, \forall g \in \mathcal{G}, \ell \in \mathcal{L} \tag{3}$$

$$\sum_{\ell \in \mathcal{L}} \sum_{g \in \mathcal{G}^r} \sum_{d \in \vartheta_g^-} x_{gd}^{\ell} = 1, \forall r \in \mathcal{R} \tag{4}$$

$$T_{g_i} + s_{g_i} + t_{g_i g_{i+1}} + (\sum_{d \in \vartheta_g^-} x_{gd}^{\ell} - 1)\eta \leq T_{g_{i+1}}, \forall g \in \mathcal{G}_m, m \in M, i = 1, \ldots, 2m-1, \ell \in \mathcal{L} \tag{5}$$

$$T_{g_{2m}} + s_{g_{2m}} + t_{g_{2m} d_1} + (x_{gd}^{\ell} - 1)\eta \leq T_{d_1}, \forall g \in \mathcal{G}_m, m \in M, d \in \{\vartheta_g^- / \ell^-\}, \ell \in \mathcal{L} \tag{6}$$

$$T_{\ell^+} + t_{\ell^+ d_1} + (x_{\ell^+ d}^{\ell} - 1)\eta \leq T_{d_1}, \forall d \in \{\vartheta_{\ell^+}^- / \ell^-\}, \ell \in \mathcal{L} \tag{7}$$

$$T_{g_{2m}} + s_{g_{2m}} + t_{g_{2m} \ell^-} + (x_{g\ell^-}^{\ell} - 1)\eta \leq T_{\ell^-}, \forall g \in \{\vartheta_{\ell^-}^+ / \ell^+\} \cap \mathcal{G}_m, m \in M, \ell \in \mathcal{L} \tag{8}$$

$$T_{\ell^+} + t_{\ell^+ \ell^-} + (x_{\ell^+ \ell^-}^{\ell} - 1)\eta \leq T_{\ell^-}, \ell \in \mathcal{L} \tag{9}$$

$$e_{g_i} \leq T_{g_i} \leq l_{g_i}, \forall g \in \mathcal{G}_m, m \in M, i = 1, \ldots, 2m \tag{10}$$

$$et_{\ell} \leq T_k \leq lt_{\ell}, \forall k \in \{\ell^- \cup \ell^+\}, \ell \in \mathcal{L} \tag{11}$$

The objective function (1) minimizes the sum of the molten iron waiting time and the travel time of locomotives. The locomotive travel time consists of an inner group (visited) travel time, the travel time between the origin of locomotive and the first visited group, the travel time between the groups in route, and the travel time between the last visited group and the destination of locomotive. Note that, if a locomotive ℓ has no group to serve, then the contribution of this route to the objective value, is the travel time from ℓ^+ to ℓ^-. Constraints (2) ensure that each locomotive commences at its origin and finishes at its destination. (3) are the flow conservation constraints. Constraints (4) guarantee that each request is served by only one locomotive. (5) are the constraints for computing the service start time of the operations in group. (6) denote the constraints for computing the service start time of a group succeeding another group, and (7) provide the constraints for the locomotive origin. Constraints (8) are used for computing the finishing time of a route that is not empty. Constraints (9) reflect the relationship between start and end time of an empty locomotive transfer. (10) are the time window constraints for the inner operations of a group. (11) are the time window constraints for the start time and the finish time of a route. Note that, in the first part of (1), $\mathcal{R}_{L_1}$ denotes the set of loaded TPC requests transported from BA to RS.

II. Detailed computational results

Table 5 to Table 9 show the detailed tuning results of parameters, as described in Section 5.2. Table 10 to Table 13 show the detailed performance of the ALNS algorithm and the local search procedure under various settings, as described in Section 5.3. The detailed computational results of the ALNS algorithm from solving extensive instances are reported in Table 14, as described in Section 5.5. As shown in Table 3, deviations between the best and average objective values of instances with sizes less than 50 are zero. Besides that, the ALNS algorithm can optimally solve the instances with 20 requests. Therefore, the corresponding results will not be presented in Table 14.

Table 5
Tuning results of roulette wheel mechanism parameters.

Inst	(π_1, π_2, π_3)						
	(1,5,3)	(1,3,5)	(3,5,1)	(3,1,5)	(5,3,1)	(5,1,3)	(1,1,1)
LRP_20#	653.4	656.6	654.3	655.1	656.6	654.6	655.4
LRP_50#	1403.4	1402.8	1404.1	1404.0	1403.9	1404.6	1402.2
LRP_80#	2255.5	2261.8	2259.7	2256.2	2258.8	2261.6	2258.0
LRP_100#	2858.9	2856.1	2857.0	2860.1	2860.2	2857.0	2855.7
LRP_120#	3287.5	3287.5	3285.6	3292.1	3287.5	3292.0	3297.8
LRP_150#	4218.4	4217.3	4217.3	4218.8	4219.1	4218.8	4218.5
LRP_200#	5309.7	5312.6	5314.4	5307.9	5310.7	5315.7	5307.1
LRP_240#	7219.9	7222.4	7217.0	7219.4	7215.0	7217.2	7215.0
LRP_300#	8770.5	8774.6	8779.2	8774.0	8774.7	8769.3	8773.2
LRP_360#	11493.1	11488.7	11491.3	11492.0	11493.8	11487.8	11492.7
LRP_450#	14286.4	14283.2	14279.6	14282.5	14279.4	14285.5	14287.7
Average	**5614.25**	5614.87	5614.50	5614.74	5614.52	5614.92	5614.85

Table 6
Tuning results of temperature.

Inst	T^{org} =200			T^{org} =150			T^{org} =100		
	Best	*Aver*	*Time*	*Best*	*Aver*	*Time*	*Best*	*Aver*	*Time*
LRP_20#	649	653.4	1.09	649	654.5	1.06	649	653.8	1.13
LRP_50#	1399	1403.4	3.63	1397	1400.5	3.63	1399	1403.7	3.80
LRP_80#	2250	2255.5	8.59	2250	2260.7	8.73	2244	2258.1	8.67
LRP_100#	2851	2858.9	13.18	2847	2855.1	13.18	2847	2859.6	13.45
LRP_120#	3277	3287.5	17.04	3280	3284.5	16.65	3278	3286.0	16.99
LRP_150#	4213	4218.4	32.04	4211	4223.2	32.27	4210	4219.6	32.61
LRP_200#	5300	5309.7	58.96	5300	5314.1	59.13	5307	5313.4	55.98
LRP_240#	7209	7219.9	101.80	7215	7220.8	104.31	7208	7218.6	102.95
LRP_300#	8763	8770.5	174.79	8757	8778.5	172.96	8766	8777.3	180.74
LRP_360#	11477	11493.1	353.52	11478	11496.2	360.13	11473	11482.7	354.61
LRP_450#	14264	14286.4	647.47	14267	14277.5	650.77	14268	14283.1	637.63
Average	5604.73	5614.25	128.37	5604.64	5615.05	129.35	**5604.45**	**5614.17**	128.05

Table 7
Tuning results of cooling rate parameter.

Inst	*cr*						
	0.95	0.97	0.99	0.995	0.997	0.999	0.99975
LRP_20#	653.8	654.3	655.0	652.0	653.0	650.0	649.2
LRP_50#	1403.7	1401.4	1404.3	1403.4	1403.5	1401.0	1401.0
LRP_80#	2258.1	2253.1	2260.0	2257.1	2255.8	2255.8	2254.5
LRP_100#	2859.6	2856.2	2853.3	2856.1	2856.5	2851.9	2852.6
LRP_120#	3286.0	3287.4	3288.0	3292.5	3289.9	3289.6	3290.2
LRP_150#	4219.6	4221.2	4220.9	4218.1	4221.8	4221.5	4222.0
LRP_200#	5313.4	5315.2	5317.4	5325.3	5313.6	5316.5	5321.1
LRP_240#	7218.6	7216.9	7223.2	7215.4	7215.7	7212.6	7216.3
LRP_300#	8777.3	8774.2	8773.5	8775.5	8773.5	8773.6	8778.9
LRP_360#	11482.7	11492.4	11489.0	11494.9	11496.3	11487.2	11494.6
LRP_450#	14283.1	14285.3	14283.1	14276.5	14287.5	14291.9	14289.3
Average	5614.17	5614.33	5615.25	5615.16	5615.19	**5613.78**	5615.43

Table 8
Tuning results of destroy rate parameter.

Inst	μ =0.07		μ =0.1		μ =0.2		μ =0.3		μ =0.4	
	Aver	*Time*	*Aver*	*Time*	*Aver*	*Time*	*Aver*	*Time*	*Aver*	*Time*
LRP_20#	651.0	1.03	650.0	1.07	649.0	1.83	649.0	2.62	649.0	3.05
LRP_50#	1403.9	2.78	1401.0	4.26	1399.6	6.86	1398.8	10.53	1397.4	12.56
LRP_80#	2261.8	5.73	2255.8	9.87	2252.0	16.71	2252.4	78.22	2247.2	37.92
LRP_100#	2856.6	9.88	2851.9	13.52	2847.8	28.41	2848.4	41.39	2848.6	44.91
LRP_120#	3296.7	12.10	3289.6	17.23	3287.0	37.39	3287.2	58.71	3284.8	81.16
LRP_150#	4223.6	21.65	4221.5	33.36	4215.8	73.39	4219.0	115.48	4222.8	172.03
LRP_200#	5324.9	38.00	5316.5	56.43	5309.0	143.43	5307.0	221.43	5316.0	278.45
LRP_240#	7217.3	64.42	7212.6	106.87	7214.2	268.76	7210.6	428.04	7217.0	535.79
LRP_300#	8784.5	112.05	8773.6	172.21	8771.4	445.44	8768.0	645.04	8795.6	844.82
LRP_360#	11498.6	223.42	11487.2	349.71	11500.6	851.36	11524.6	1441.65	11584.4	1880.26
LRP_450#	14293.6	403.48	14291.9	656.32	14319.6	1286.60	14309.0	2181.44	14383.2	2455.65
Average	5619.32	81.32	**5613.78**	129.17	5615.09	287.29	5615.82	474.96	5631.45	576.96

Table 9
Tuning results of the noise parameter.

ϵ	*Best*	*Aver*	*Time*	ϵ	*Best*	*Aver*	*Time*
0.000	5600.82	5613.78	129.17	0.100	5603.00	5610.25	128.05
0.025	5601.00	5610.36	128.14	0.150	5603.27	5611.80	128.26
0.050	5602.27	5610.97	128.37	0.200	5603.09	5612.97	128.50
0.070	5602.00	5611.15	129.35	0.300	5604.73	5611.90	128.74

Table 10
Average performance of each removal or insertion operator for all the test instances.

Item	*Insertion operators*								
	—	—	*RSI*	*FFI*	*GI*	*RI_2*	*RI_3*	*RI_4*	*RI_7*
Single	—	—	3.2E-03	2.4E-03	4.5E-03	5.1E-03	5.2E-03	5.3E-03	5.3E-03
Sum	—	—	8.46	2.76	18.31	23.43	22.98	21.40	22.07
Number	—	—	2760.75	1906.21	3822.86	4404.42	4205.69	3938.31	3961.75
Best	—	—	0.96	1.35	2.12	2.47	2.05	1.95	1.77
Better	—	—	8.00	36.31	70.84	88.86	76.96	73.38	72.21
Worse	—	—	879.63	565.85	1767.74	2157.34	1974.26	1839.30	1854.52
Item	*Removal operators*								
	RR	*WR*	*SRR*	*SR*	*TOR*	*DOR*	*EDOR*	*COR*	*HKR*
Single	1.7E-05	1.2E-03	9.2E-06	9.9E-04	2.9E-05	2.4E-05	1.8E-05	9.5E-04	1.5E-05
Sum	0.07	3.79	0.00	2.48	0.11	0.05	0.07	2.94	0.03
Number	4120.92	3596.72	594.73	3304.18	4178.79	1673.05	3553.87	2370.18	1607.55
Best	1.82	1.50	0.35	1.98	1.93	0.88	1.99	1.61	0.63
Better	73.19	64.57	13.92	59.04	69.97	34.53	71.92	62.90	4.95
Worse	1913.70	1548.15	93.37	1230.86	1909.76	531.92	2278.09	1048.76	484.01

Table 11
Average performance of the ALNS algorithm under various settings.

Settings	*Best*	*Aver*	*Time*	*Settings*	*Best*	*Aver*	*Time*
RR	5601.91	5611.55	132.77	*RSI*	5601.73	5611.30	129.18
WR	5602.82	5610.36	132.47	*FFI*	5602.09	5610.85	130.60
SRR	5601.73	5610.43	128.82	*GI*	5601.64	5611.43	127.42
SR	5603.64	5615.57	131.68	*RI_2*	5602.00	5611.58	124.23
TOR	5603.18	5610.88	136.06	*RI_3*	5602.36	5610.79	126.20
DOR	5602.55	5611.15	130.30	*RI_4*	5602.18	5610.55	127.40
EDOR	5602.55	5611.94	127.64	*RI_7*	5602.00	5610.30	126.88
COR	5602.27	5610.94	126.87	*FM*	5601.00	5610.36	128.14
HKR	5601.18	5611.02	129.25	*LNS*	5608.09	5618.75	119.18

Table 12
Average performance of the local search procedure under various settings.

Item	*Initialization*	*FM*	*Disabled neighborhood structure*					
			SRR	*ISRR*	*ISGR*	*IMGR*	*IC*	*IRR*
Time	0.18	0.51	0.48	0.29	0.35	0.31	0.48	0.50
Best	5877.00	5670.18	5686.91	5792.09	5680.45	5774.09	5681.82	5674.55
Aver	5877.00	5683.41	5704.29	5801.96	5700.05	5786.01	5706.96	5697.72

Table 13
Detailed comparison results for different neighbor acceptance criteria.

Inst	*BKS*	LS_I					LS_{II}				
		Best	*Aver*	*Time*	D_B(%)	D_A(%)	*Best*	*Aver*	*Time*	D_B(%)	D_A(%)
LRP_20#	649	649	649.0	1.27	0.00	0.00	649	649.0	1.33	0.00	0.00
LRP_50#	1397	1397	1398.0	4.45	0.00	0.07	1397	1398.4	4.69	0.00	0.10
LRP_80#	2241	2242	2244.9	11.00	0.04	0.17	2241	2243.8	10.56	0.00	0.12
LRP_100#	2841	2841	2844.1	16.87	0.00	0.11	2841	2841.9	15.68	0.00	0.03
LRP_120#	3276	3277	3279.0	21.13	0.03	0.09	3276	3278.6	22.03	0.00	0.08
LRP_150#	4204	4205	4208.1	41.31	0.02	0.10	4204	4208.8	40.24	0.00	0.11
LRP_200#	5287	5291	5295.0	70.02	0.08	0.15	5290	5294.4	69.48	0.06	0.14
LRP_240#	7174	7203	7207.6	135.65	0.40	0.47	7203	7208.0	124.96	0.40	0.47
LRP_300#	8736	8736	8747.7	207.44	0.00	0.13	8739	8750.2	206.00	0.03	0.16
LRP_360#	11446	11449	11455.9	427.47	0.03	0.09	11448	11455.2	423.82	0.02	0.08
LRP_450#	14230	14230	14239.5	738.34	0.00	0.07	14230	14240.1	747.00	0.00	0.07
Average	5589.18	5592.73	5597.16	152.27	0.06	0.13	5592.55	5597.13	151.44	0.05	0.13

Inst	*BKS*	*NONE*					LS_{new}				
		Best	*Aver*	*Time*	D_B(%)	D_A(%)	*Best*	*Aver*	*Time*	D_B(%)	D_A(%)
LRP_20#	649	649	650.4	1.08	0.00	0.22	649	649.0	1.25	0.00	0.00
LRP_50#	1397	1397	1398.5	3.76	0.00	0.11	1397	1397.2	4.01	0.00	0.01
LRP_80#	2241	2244	2252.1	8.55	0.13	0.50	2241	2243.4	9.79	0.00	0.11
LRP_100#	2841	2843	2854.2	13.04	0.07	0.46	2841	2841.8	15.10	0.00	0.03
LRP_120#	3276	3279	3292.6	17.28	0.09	0.51	3276	3277.2	19.57	0.00	0.04
LRP_150#	4204	4212	4218.1	32.48	0.19	0.34	4205	4207.7	36.69	0.02	0.09
LRP_200#	5287	5301	5311.9	58.47	0.26	0.47	5287	5292.8	64.61	0.00	0.11
LRP_240#	7174	7207	7212.6	103.15	0.46	0.54	7174	7200.3	115.53	0.00	0.37
LRP_300#	8736	8756	8773.2	176.23	0.23	0.43	8737	8744.3	187.88	0.01	0.10
LRP_360#	11446	11471	11481.4	351.04	0.22	0.31	11446	11451.1	387.99	0.00	0.04
LRP_450#	14230	14252	14269.0	644.40	0.15	0.27	14231	14239.4	680.63	0.01	0.07
Average	5589.18	5601.00	5610.36	128.14	0.16	0.38	5589.45	5594.93	138.46	0.01	0.09

Table 14
Computational results for all the instances.

Inst	*Best*	*Aver*	*Time*	*D(%)*	*Inst*	*Best*	*Aver*	*Time*	*D(%)*
LRP_50_01	1458	1458.1	4.21	0.01	LRP_80_01	2551	2553.2	9.98	0.09
LRP_50_02	1434	1435.9	3.89	0.13	LRP_80_02	2439	2440.2	10.47	0.05
LRP_50_03	1454	1454.4	4.55	0.03	LRP_80_03	2122	2124.3	9.48	0.11
LRP_50_04	1305	1305.6	4.36	0.05	LRP_80_04	2398	2399.1	9.71	0.05
LRP_50_05	1331	1331.5	4.49	0.04	LRP_80_05	2323	2324.0	10.60	0.04
LRP_50_06	1388	1388.0	4.53	0.00	LRP_80_06	2090	2090.3	10.03	0.01
LRP_50_07	1285	1285.2	3.90	0.02	LRP_80_07	2177	2178.6	9.32	0.07
LRP_50_08	1302	1306.5	3.81	0.35	LRP_80_08	2287	2288.6	10.09	0.07
LRP_50_09	1465	1465.0	4.03	0.00	LRP_80_09	2328	2329.3	9.91	0.06
LRP_50_10	1303	1303.7	4.32	0.05	LRP_80_10	2458	2458.1	9.47	0.00
LRP_100_01	2829	2831.6	16.44	0.09	LRP_120_01	3446	3448.3	23.69	0.07
LRP_100_02	2884	2884.8	15.36	0.03	LRP_120_02	3632	3633.0	22.47	0.03
LRP_100_03	2973	2973.2	15.81	0.01	LRP_120_03	3673	3673.6	22.71	0.02
LRP_100_04	2838	2838.0	15.48	0.00	LRP_120_04	3417	3421.0	19.76	0.12
LRP_100_05	2796	2800.6	13.61	0.16	LRP_120_05	3495	3498.2	23.04	0.09
LRP_100_06	2973	2974.8	15.92	0.06	LRP_120_06	3507	3509.0	22.96	0.06
LRP_100_07	2665	2666.7	13.60	0.06	LRP_120_07	3587	3589.0	21.23	0.06
LRP_100_08	2977	2978.8	15.56	0.06	LRP_120_08	3787	3789.2	22.57	0.06
LRP_100_09	2704	2710.1	13.49	**0.23**	LRP_120_09	4066	4070.1	23.63	0.10
LRP_100_10	3081	3083.8	15.65	0.09	LRP_120_10	3315	3317.7	20.44	0.08
LRP_150_01	4319	4322.0	36.01	0.07	LRP_200_01	5694	5700.6	71.09	0.12
LRP_150_02	4322	4323.7	35.97	0.04	LRP_200_02	5785	5792.4	69.82	0.13
LRP_150_03	4614	4619.0	38.09	0.11	LRP_200_03	5321	5326.8	70.56	0.11
LRP_150_04	4371	4375.5	39.17	0.10	LRP_200_04	5550	5554.5	74.99	0.08
LRP_150_05	4560	4561.4	37.90	0.03	LRP_200_05	5720	5722.4	67.78	0.04
LRP_150_06	4299	4303.5	38.49	0.10	LRP_200_06	5667	5671.8	76.26	0.08
LRP_150_07	4556	4560.8	39.49	0.11	LRP_200_07	5787	5788.1	67.97	0.02
LRP_150_08	4628	4631.3	34.82	0.07	LRP_200_08	5465	5468.7	73.12	0.07
LRP_150_09	4631	4634.8	38.29	0.08	LRP_200_09	5990	5992.9	74.36	0.05
LRP_150_10	4407	4409.6	36.48	0.06	LRP_200_10	5543	5545.3	74.68	0.04
LRP_240_01	6944	6948.1	119.40	0.06	LRP_300_01	9092	9097.5	215.09	0.06
LRP_240_02	7062	7066.5	122.92	0.06	LRP_300_02	9365	9371.7	201.85	0.07
LRP_240_03	7045	7050.6	118.98	0.08	LRP_300_03	9323	9329.8	223.52	0.07
LRP_240_04	7101	7109.4	114.08	0.12	LRP_300_04	8543	8547.7	182.16	0.06
LRP_240_05	7096	7100.3	121.05	0.06	LRP_300_05	8877	8881.4	219.82	0.05
LRP_240_06	6715	6718.8	117.22	0.06	LRP_300_06	8995	9000.8	212.74	0.06
LRP_240_07	7288	7290.9	121.87	0.04	LRP_300_07	9127	9131.3	226.56	0.05
LRP_240_08	6963	6968.3	114.45	0.08	LRP_300_08	9327	9331.0	197.52	0.04
LRP_240_09	6915	6919.0	115.01	0.06	LRP_300_09	9302	9308.6	231.26	0.07
LRP_240_10	6854	6857.3	120.92	0.05	LRP_300_10	8830	8836.8	213.69	0.08
LRP_360_01	10411	10416.3	364.22	0.05	LRP_450_01	13560	13566.0	731.94	0.04
LRP_360_02	10041	10049.5	388.97	0.08	LRP_450_02	13792	13798.9	640.24	0.05
LRP_360_03	11252	11256.9	374.66	0.04	LRP_450_03	13508	13512.3	750.52	0.03
LRP_360_04	10766	10770.6	404.36	0.04	LRP_450_04	14255	14263.3	738.84	0.06
LRP_360_05	10290	10298.5	392.71	0.08	LRP_450_05	13938	13948.9	784.85	0.08
LRP_360_06	10784	10789.2	398.49	0.05	LRP_450_06	13274	13280.9	694.45	0.05
LRP_360_07	10149	10157.3	334.55	0.08	LRP_450_07	14114	14129.7	673.84	0.11
LRP_360_08	10563	10574.7	332.54	0.11	LRP_450_08	13406	13412.4	748.43	0.05
LRP_360_09	10965	10976.1	331.85	0.10	LRP_450_09	13777	13791.0	672.94	0.10
LRP_360_10	11854	11876.2	329.54	0.19	LRP_450_10	14126	14135.1	747.34	0.06
Average	5589.84	5593.66	143.36	0.06					