Results for the HIRP-BS instances

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1 Results for the small-scale instances

| Id. | MILP model | | | | SEMPO algorithm | | | | | Gap_{LR} | Gap_{UB} |
	LR	UB	Gap_{UL}	t^* (s)	z^*	z^w	$\bar{z}$	z^{sdv}	$\bar{t^*}$ (s)		
1	14362.21	-	-	3600	**15070.70**	15186.60	15134.38	39.25	789	4.70	-
2	14349.83	-	-	3600	**15430.10**	15554.10	15477.01	38.34	626	7.00	-
3	13192.78	**13787.07**	2.31	2755	14000.50	14188.70	14086.11	57.48	947	5.77	1.52
4	15117.77	16070.72	4.11	3600	**15860.80**	15945.00	15899.31	32.12	841	4.68	-1.32
5	12649.02	14871.81	12.26	3600	**14470.00**	14746.90	14575.43	93.03	722	12.58	-2.78
6	12013.27	**12709.82**	2.71	3600	13077.60	13188.20	13140.11	32.91	951	8.14	2.81
7	11091.08	**11667.72**	2.33	3600	11855.70	11948.10	11910.31	24.30	1063	6.45	1.59
8	13417.15	**13948.06**	1.96	3600	14497.40	14663.30	14583.48	63.23	546	7.45	3.79
9	11195.60	**11722.88**	1.98	3560	11953.50	11997.70	11979.08	12.65	994	6.34	1.93
10	12406.95	13327.03	4.31	3600	**13324.60**	13420.20	13374.03	34.05	970	6.89	-0.02
11	15287.85	17630.63	11.70	3600	**16263.50**	16363.60	16317.16	33.57	1245	6.00	-8.41
12	15118.76	**15689.13**	1.92	3562	16041.20	16142.80	16105.04	30.15	716	5.75	2.19
13	16058.64	**16535.69**	1.51	3600	16889.80	17046.40	16984.97	50.20	636	4.92	2.10
Avg			4.28	3519				41.64	850	6.67	0.31

Table 1: Results for the small-scale instances

2 Results for the medium-scale instances

| Instances | | | MILP model | SEMPO algorithm | | | | | Gap_{LR} |
$\|\mathcal{N}\|$	$\|\mathcal{T}\|$	Id.	LR	z^*	z^w	$\bar{z}$	z^{sdv}	$\bar{t^*}$ (s)	
20	14	1	31765.05	33861.00	34310.40	34135.72	152.40	568	6.19
		2	35995.55	38037.40	38184.90	38098.06	50.75	934	5.37
		3	36849.88	39391.00	39677.50	39533.20	87.06	845	6.45
	21	1	70705.51	74315.90	74685.10	74477.94	125.89	634	4.86
		2	67279.77	71637.70	71959.80	71773.83	86.61	697	6.08
		3	81136.08	85644.50	86204.60	85957.79	213.05	1069	5.26
	28	1	105572.10	112247.97	114155.00	113299.10	813.64	1213	5.95
		2	108853.94	115040.73	116761.00	115569.96	486.08	723	5.38
		3	96870.66	102777.00	104181.00	103317.85	482.34	748	5.75
34	7	1	21504.21	23272.60	23462.20	23372.28	64.95	928	7.60
		2	25220.85	26918.00	27388.40	27168.72	138.79	843	6.30
		3	19551.37	21610.70	21773.50	21699.36	66.91	634	9.53
	14	1	64725.84	68249.90	68664.50	68480.09	148.40	1175	5.16
		2	58026.87	63853.30	64305.60	64156.87	152.21	471	9.12
		3	60027.36	66903.30	69413.60	67992.80	749.34	945	10.28
	21	1	112811.34	120413.00	121767.00	121000.50	449.45	788	6.31
		2	142540.14	152232.00	154337.00	153684.00	812.55	1019	6.37
		3	125961.65	135518.00	137021.00	136466.10	484.19	941	7.05
	28	1	199983.60	210551.00	211847.00	211313.40	379.20	948	5.02
		2	194899.22	211936.00	213026.00	212255.30	303.29	914	8.04
		3	198494.93	212032.48	214014.00	213063.18	730.89	1227	6.38
	7	1	28952.92	31531.70	32216.50	31836.35	186.75	1070	8.18
		2	31393.57	34461.50	35002.90	34739.92	179.66	772	8.90
		3	25408.63	27565.80	27845.20	27684.01	79.09	833	7.83

$|\mathcal{N}|$	$|\mathcal{T}|$	Id.	LR	z^*	z^w	$\bar{z}$	z^{sdv}	$\bar{t}^*$ (s)	Gap_{LR}
	14	1	70858.72	74801.30	75545.10	75232.20	203.08	1058	5.27
		2	85473.88	91480.70	91840.00	91686.45	103.67	802	6.57
		3	78769.42	85545.30	86500.70	86094.61	267.94	850	7.92
	21	1	163482.68	174044.00	174392.00	174175.90	99.85	945	6.07
		2	165078.24	173148.00	174971.00	174330.50	679.94	1088	4.66
		3	129226.17	138930.00	139341.00	139166.00	108.66	888	6.98
	28	1	232277.48	245113.00	245555.00	245387.30	148.83	888	5.24
		2	263986.87	281252.00	282505.00	281903.30	396.04	936	6.14
		3	249555.84	265153.00	265668.00	265435.40	191.95	1053	5.88
58	7	1	46315.26	52713.20	53387.20	53026.60	251.08	676	12.14
		2	27474.70	33768.10	34370.00	34107.19	194.95	1036	18.64
		3	37506.27	43614.60	44267.90	44028.97	242.42	784	14.01
	14	1	100262.00	112607.00	113317.00	112918.60	228.33	950	10.96
		2	102989.70	124007.00	124892.00	124339.50	266.90	728	16.95
		3	118288.86	129879.00	132119.00	131319.70	847.64	1164	8.92
	21	1	199673.24	222510.00	223928.00	222944.20	479.55	1308	10.26
		2	198632.42	220827.00	222426.00	221688.20	527.22	910	10.05
		3	187080.90	216367.00	217453.00	216936.00	383.59	774	13.54
	28	1	312777.77	338614.00	341230.00	340238.10	831.13	993	7.63
		2	289651.41	324261.00	325817.00	324912.10	505.19	1091	10.67
		3	344415.47	380963.00	385579.00	382520.00	1399.66	822	9.59
83	7	1	46176.09	53916.50	54359.30	54054.96	132.68	801	14.36
		2	45115.89	53376.90	53819.60	53657.34	124.79	679	15.48
		3	48785.68	55261.00	55892.40	55641.00	211.91	997	11.72
	14	1	150855.25	168151.00	168906.00	168624.30	251.30	874	10.29
		2	115554.71	129975.00	131003.00	130494.40	370.69	812	11.09
		3	161514.81	179839.00	180555.00	180194.70	214.70	811	10.19
	21	1	220407.99	240328.00	242961.00	241556.80	713.51	1225	8.29
		2	272141.84	298430.00	301140.00	299549.70	826.73	1095	8.81
		3	254559.93	280787.00	282879.00	281799.80	659.61	1372	9.34
	28	1	–	485412.00	488434.00	487275.20	924.85	1044	–
		2	458910.43	499365.00	501946.00	500579.90	798.14	863	8.10
		3	–	442948.00	444221.00	443590.80	420.45	1250	–
Avg							375.97	921	8.53

Table 2: Results for the medium-scale instances

3 Results for the large-scale instances

Instances			MILP model	SEMPO algorithm					Gap_{LR}
$|\mathcal{N}|$	$|\mathcal{T}|$	Id.	LR	z^*	z^w	$\bar{z}$	z^{sdv}	$\bar{t}^*$ (s)	
114	7	1	63214.61	73697.50	74914.70	74120.87	357.73	1288.13	14.22
		2	62803.88	72296.70	73236.40	72902.97	293.43	1057.53	13.13
		3	62229.09	70788.60	71175.00	70952.09	129.24	836.96	12.09
	14	1	160846.19	183068.00	184650.00	183790.90	524.65	689.14	12.14
		2	240633.57	268914.00	271892.00	270369.50	965.68	809.31	10.52
	21	1	368429.18	409142.00	410697.00	409722.40	627.68	683.57	9.95
149	28	1	-	900932.00	905981.00	904061.50	2204.26	780.12	-
170	21	1	-	537235.00	539239.00	538574.90	687.44	1103.05	-
	28	1	-	852666.00	856599.00	854943.00	1628.57	888.50	-
183	7	1	-	98708.70	99711.30	99123.17	326.58	806.78	-
Avg							774.53	894.31	12.01

Table 3: Results for the large-scale instances