


```

81 StrongCG: 7
82 Flow cover: 42
83 Zero half: 2
84 RLT: 42
85 Relax-and-lift: 635
86 BQP: 53
87
88 Explored 4183 nodes (352634 simplex iterations) in 56.41 seconds (77.19 work units)
89 Thread count was 8 (of 8 available processors)
90
91 Solution count 3: 628 628 628
92 No other solutions better than 628
93
94 Optimal solution found (tolerance 1.00e-04)
95 Best objective 6.2800000000000e+02, best bound 6.2800000000000e+02, gap 0.0000%
96
97 Output optimal solution and the Optimal Obj: 628.0
98
99
100 Obj = 628.0
101
102 Solutions:
103   The total pi = 112.0
104   The total duration time in berth stage = 93.0
105   The total duration time in quay crane scheduling stage = 27.0
106   The total departure time in berth stage= 347.0
107   The total departure time in quay crane scheduling stage = 281.0
108   The total wasted crane work hour according QC0= 3.7041882235135257
109   The last departure time in quay crane scheduling stage = 63.0
110
111 The specific solution are as follows:
112 Vessel i: 0:   li: 6,      pi: 28-34,      ai-di: 45-54,      taoi-deltai: 45-54,      periodi: 9,      taoPi_SP-deltaPi_SP
: 45-50,      periodPi: 5,      c_i: 2351588,      dowork: 2636440,      fa_i: 1
113 Vessel i: 1:   li: 7,      pi: 7-14,      ai-di: 51-61,      taoi-deltai: 51-61,      periodi: 10,      taoPi_SP-deltaPi_SP
: 51-53,      periodPi: 2,      c_i: 2568806,      dowork: 2636440,      fa_i: 5
114 Vessel i: 2:   li: 5,      pi: 14-19,      ai-di: 53-67,      taoi-deltai: 53-67,      periodi: 14,      taoPi_SP-
deltaPi_SP: 53-56,      periodPi: 3,      c_i: 3516800,      dowork: 3559194,      fa_i: 4
115 Vessel i: 3:   li: 4,      pi: 30-34,      ai-di: 55-71,      taoi-deltai: 55-71,      periodi: 16,      taoPi_SP-
deltaPi_SP: 55-63,      periodPi: 8,      c_i: 3965516,      dowork: 4218304,      fa_i: 1
116 Vessel i: 4:   li: 5,      pi: 19-24,      ai-di: 22-46,      taoi-deltai: 22-43,      periodi: 21,      taoPi_SP-
deltaPi_SP: 22-26,      periodPi: 4,      c_i: 5464079,      dowork: 5536524,      fa_i: 4
117 Vessel i: 5:   li: 5,      pi: 14-19,      ai-di: 28-57,      taoi-deltai: 28-51,      periodi: 23,      taoPi_SP-
deltaPi_SP: 28-33,      periodPi: 5,      c_i: 5807338,      dowork: 6063812,      fa_i: 3
118 TimeSolveModel: 63.000000
119
120 TimeAll: 67.000000
121
122

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