



```
81 StrongCG: 66
82 Flow cover: 28
83 Mod-K: 2
84 RLT: 6
85 Relax-and-lift: 562
86 BQP: 10
87
88 Explored 1353 nodes (33408 simplex iterations) in 34.78 seconds (38.81 work units)
89 Thread count was 8 (of 8 available processors)
90
91 Solution count 3: 365 365 365
92 No other solutions better than 365
93
94 Optimal solution found (tolerance 1.00e-04)
95 Best objective 3.650000000000e+02, best bound 3.650000000000e+02, gap 0.0000%
96
97 Output optimal solution and the Optimal Obj: 365.0
98
99
100 Obj = 365.0
101
102 Solutions:
103   The total pi = 81.0
104   The total duration time in berth stage = 92.0
105   The total duration time in quay crane scheduling stage = 23.0
106   The total departure time in berth stage= 217.0
107   The total departure time in quay crane scheduling stage = 148.0
108   The total wasted crane work hour according QC0= 2.5563335406836494
109   The last depature time in quay crane scheduling stage = 53.0
110
111 The specific solution are as follows:
112 Vessel i: 0:   li: 4,      pi: 22-26,      ai-di: 49-67,      taoi-deltai: 49-65,      periodi: 16,      taoPi_SP-
deltaPi_SP: 49-53,      periodPi: 4,      c_i: 4187941,      dowork: 4218304,      fa_i: 3
113 Vessel i: 1:   li: 5,      pi: 24-29,      ai-di: 7-29,      taoi-deltai: 7-27,      periodi: 20,      taoPi_SP-deltaPi_SP
: 7-13,      periodPi: 6,      c_i: 5118689,      dowork: 5272880,      fa_i: 2
114 Vessel i: 2:   li: 4,      pi: 20-24,      ai-di: 15-40,      taoi-deltai: 15-38,      periodi: 23,      taoPi_SP-
deltaPi_SP: 15-22,      periodPi: 7,      c_i: 5958858,      dowork: 6063812,      fa_i: 2
115 Vessel i: 3:   li: 7,      pi: 7-14,      ai-di: 41-59,      taoi-deltai: 41-52,      periodi: 11,      taoPi_SP-deltaPi_SP
: 41-43,      periodPi: 2,      c_i: 2778960,      dowork: 3031906,      fa_i: 4
116 Vessel i: 4:   li: 6,      pi: 8-14,      ai-di: 13-45,      taoi-deltai: 13-35,      periodi: 22,      taoPi_SP-deltaPi_SP
: 13-17,      periodPi: 4,      c_i: 5536838,      dowork: 5668346,      fa_i: 4
117 TimeSolveModel: 41.000000
118
119 TimeAll: 44.000000
120
121
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