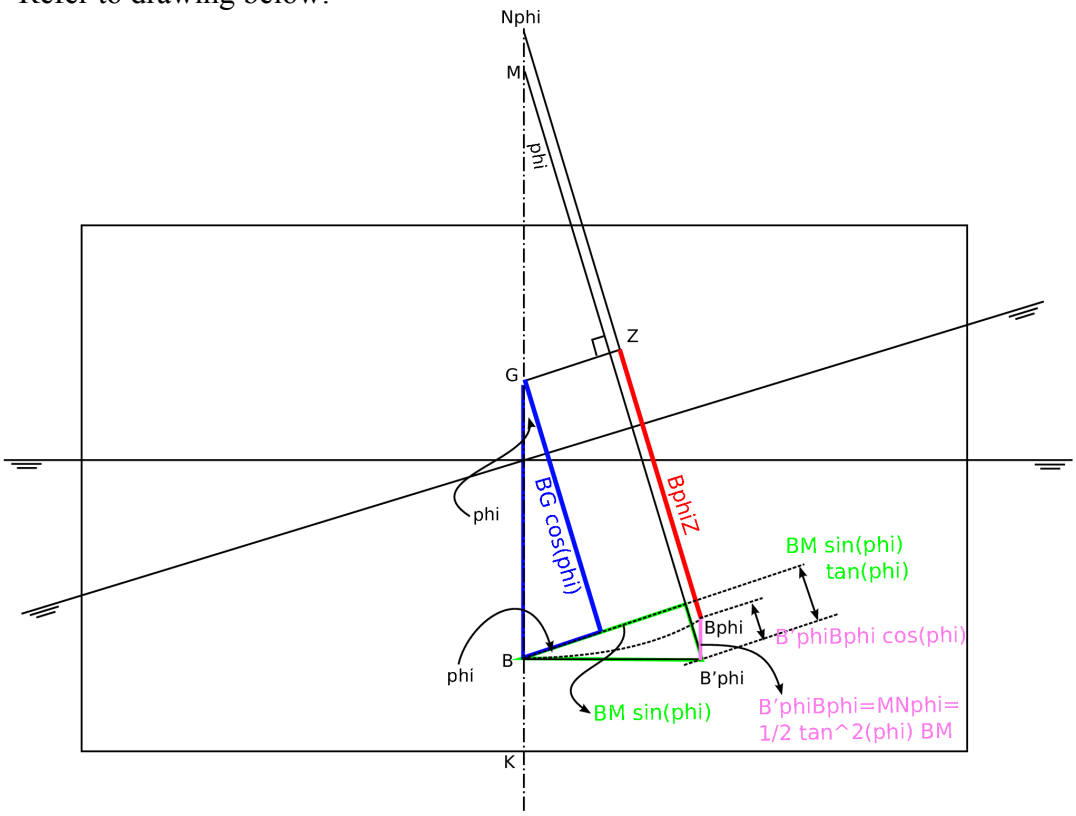
Exercises on Offshore Hydromechanics
J.M.J. Journee and W.W. Massie
Short answers

1. **Miscellaneous on Static Loads**
   a) Yes.
   b) Force to lift pipe: 600 N, force to lift steel cover: 1611 N, force to lift plywood cover: 1548 N

2. **Miscellaneous on Static Floating Stability**
   a) $m = \rho \nabla$
   b) …
   c) Scribanti formula: refer to book Offshore Hydromechanics
   d) …
   e) …
   f) Refer to drawing below:



BphiZ = BG cos(phi)+
BM sin(phi) tan(phi)−
B'phiBphi cos(phi)
= BG cos(phi)+
BM tan(phi) sin(phi)/cos(phi) cos(phi)−
1/2 tan²(phi) BM cos(phi)
= BG cos(phi)+
BM tan²(phi) cos(phi)−
1/2 tan²(phi) BM cos(phi)
=(BG+1/2 tan²(phi) BM) cos(phi)

   g) …

h) $\phi = \pm \arctan \sqrt{\frac{-2GM}{BM}}$

i) 32.3 degrees

j) …

k) GM = 1.972 m, GZ = 0.536 m and 1.047 m

l) …

m) Ok, this is more of an intelligence test than anything else...

3. Float-On Float-Off Pontoon

a) amidships at middle line plane with KG = 4.02 m, G_0M_0 = 45.15 m

b) 0.38 deg

c) 1.28, 2.00, 2.04, and 2.76 m resp.

d) 1.16 deg

e) 9.93 m

f) 1.55 m

g) 1.62 m

h) 25.94 m

i) 5.51 m

j) 10.86 m

k) 2.61 deg

4. Metacentric Height

0.44 m

5. Unloading a Pontoon

a) 0.975 m

b) 11.3 deg

c) 58.33 ton and 1.35 m

6. Lift Operation by a Pontoon

16.5 deg

7. Deck Load on a Drill Platform

a) T_A = 38.10 m, $_{TC}$ = 29.18 m, T_D = 13.05 m, and T_F = 21.97 m

b) h_C = 3.45 m and h_E = 6.90 m

c) T = 27.30 m

d) G'M = 1.44 m

8. Load a Semi-Submersible

$T_A = T_D$ =12.48 m and $T_B = T_C$ = 22.52 m

9. Loading a Drill Platform

a) 4.33 deg

b) T_A = 3.56 m, T_B = 5.87 m, and T_C = 5.87 m

c) h_A = 0.75 m

d) G'M = 12.21 m

10. Buckling of a Drill String a) and b) Refer to book Offshore Hydromechanics