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LAMPIRAN

Lampiran 1. Tabel Perhitungan Kekuatan Batas Kapal FPSO Kondisi awal menggunakan Metode NLFEA Kondisi *Sagging* dan *Hogging* (Hasil Olahan, 2024)

sagging		*hogging*	
Bending Moment	*Curvature*	*Bending Moment*	*Curvature*
0,000E+00	0,000E+00	0,000E+00	0,000E+00
-2,703E+11	-5,896E-04	1,000E+12	2,359E-03
-5,405E+11	-1,179E-03	2,000E+12	4,717E-03
-8,108E+11	-1,769E-03	3,000E+12	7,076E-03
-1,081E+12	-2,359E-03	4,000E+12	9,434E-03
-1,351E+12	-2,948E-03	5,000E+12	1,179E-02
-1,622E+12	-3,538E-03	6,000E+12	1,415E-02
-1,892E+12	-4,127E-03	7,000E+12	1,651E-02
-2,162E+12	-4,717E-03	8,000E+12	1,887E-02
-2,432E+12	-5,307E-03	9,000E+12	2,123E-02
-2,703E+12	-5,896E-03	1,000E+13	2,359E-02
-2,973E+12	-6,486E-03	1,100E+13	2,594E-02
-3,243E+12	-7,076E-03	1,200E+13	2,830E-02
-3,514E+12	-7,665E-03	1,300E+13	3,066E-02
-3,784E+12	-8,255E-03	1,400E+13	3,302E-02
-4,054E+12	-8,845E-03	1,500E+13	3,538E-02
-4,324E+12	-9,434E-03	1,600E+13	3,774E-02
-4,595E+12	-1,002E-02	1,700E+13	4,009E-02
-4,865E+12	-1,061E-02	1,800E+13	4,245E-02
-5,135E+12	-1,120E-02	1,900E+13	4,481E-02
-5,405E+12	-1,179E-02	2,000E+13	4,717E-02
-5,676E+12	-1,238E-02	2,100E+13	4,953E-02
-5,946E+12	-1,297E-02	2,200E+13	5,189E-02
-6,216E+12	-1,356E-02	2,300E+13	5,425E-02
-6,486E+12	-1,415E-02	2,400E+13	5,660E-02
-6,757E+12	-1,474E-02	2,500E+13	5,896E-02
-7,027E+12	-1,533E-02	2,600E+13	6,132E-02
-7,297E+12	-1,592E-02	2,700E+13	6,368E-02
-7,568E+12	-1,651E-02	2,800E+13	6,604E-02
-7,838E+12	-1,710E-02	2,900E+13	6,840E-02

-8,108E+12	-1,769E-02	3,000E+13	7,075E-02
-8,378E+12	-1,828E-02	3,100E+13	7,311E-02
-8,649E+12	-1,887E-02	3,200E+13	7,547E-02
-8,919E+12	-1,946E-02	3,300E+13	7,783E-02
-9,189E+12	-2,005E-02	3,400E+13	8,019E-02
-9,459E+12	-2,064E-02	3,500E+13	8,255E-02
-9,730E+12	-2,123E-02	3,600E+13	8,490E-02
-1,000E+13	-2,182E-02	3,700E+13	8,726E-02
-1,027E+13	-2,241E-02	3,800E+13	8,962E-02
-1,054E+13	-2,300E-02	3,900E+13	9,198E-02
-1,081E+13	-2,359E-02	4,000E+13	9,434E-02
-1,108E+13	-2,418E-02	4,100E+13	9,670E-02
-1,135E+13	-2,476E-02	4,200E+13	9,905E-02
-1,162E+13	-2,535E-02	4,300E+13	1,014E-01
-1,189E+13	-2,594E-02	4,400E+13	1,038E-01
-1,216E+13	-2,653E-02	4,499E+13	1,061E-01
-1,243E+13	-2,712E-02	4,599E+13	1,085E-01
-1,270E+13	-2,771E-02	4,699E+13	1,109E-01
-1,297E+13	-2,830E-02	4,799E+13	1,132E-01
-1,324E+13	-2,889E-02	4,898E+13	1,156E-01
-1,351E+13	-2,948E-02	4,998E+13	1,179E-01
-1,378E+13	-3,007E-02	5,098E+13	1,203E-01
-1,405E+13	-3,066E-02	5,197E+13	1,227E-01
-1,432E+13	-3,125E-02	5,296E+13	1,250E-01
-1,459E+13	-3,184E-02	5,394E+13	1,274E-01
-1,486E+13	-3,243E-02	5,491E+13	1,299E-01
-1,514E+13	-3,302E-02	5,578E+13	1,325E-01
-1,541E+13	-3,361E-02	5,647E+13	1,353E-01
-1,568E+13	-3,420E-02	5,689E+13	1,379E-01
-1,595E+13	-3,479E-02	5,733E+13	1,414E-01
-1,622E+13	-3,538E-02	5,760E+13	1,442E-01
-1,649E+13	-3,597E-02	5,770E+13	1,453E-01
-1,676E+13	-3,656E-02	5,770E+13	1,456E-01
-1,703E+13	-3,715E-02	5,770E+13	1,456E-01
-1,730E+13	-3,774E-02		
-1,757E+13	-3,833E-02		

-1,784E+13	-3,892E-02
-1,811E+13	-3,951E-02
-1,838E+13	-4,010E-02
-1,865E+13	-4,069E-02
-1,892E+13	-4,127E-02
-1,919E+13	-4,186E-02
-1,946E+13	-4,245E-02
-1,973E+13	-4,304E-02
-2,000E+13	-4,363E-02
-2,027E+13	-4,422E-02
-2,054E+13	-4,481E-02
-2,081E+13	-4,540E-02
-2,108E+13	-4,599E-02
-2,135E+13	-4,658E-02
-2,162E+13	-4,717E-02
-2,189E+13	-4,776E-02
-2,216E+13	-4,835E-02
-2,243E+13	-4,894E-02
-2,270E+13	-4,953E-02
-2,297E+13	-5,012E-02
-2,324E+13	-5,071E-02
-2,351E+13	-5,130E-02
-2,378E+13	-5,189E-02
-2,413E+13	-5,248E-02
-2,443E+13	-5,307E-02
-2,470E+13	-5,366E-02
-2,497E+13	-5,425E-02
-2,524E+13	-5,484E-02
-2,551E+13	-5,543E-02
-2,578E+13	-5,602E-02
-2,605E+13	-5,661E-02
-2,632E+13	-5,735E-02
-2,659E+13	-5,802E-02
-2,686E+13	-5,861E-02
-2,713E+13	-5,920E-02
-2,740E+13	-5,979E-02

-2,767E+13	-6,038E-02
-2,794E+13	-6,096E-02
-2,821E+13	-6,155E-02
-2,848E+13	-6,214E-02
-2,876E+13	-6,273E-02
-2,903E+13	-6,332E-02
-2,930E+13	-6,391E-02
-2,957E+13	-6,450E-02
-2,984E+13	-6,509E-02
-3,011E+13	-6,568E-02
-3,038E+13	-6,627E-02
-3,065E+13	-6,686E-02
-3,092E+13	-6,745E-02
-3,119E+13	-6,804E-02
-3,146E+13	-6,863E-02
-3,173E+13	-6,922E-02
-3,200E+13	-6,981E-02
-3,227E+13	-7,040E-02
-3,254E+13	-7,099E-02
-3,281E+13	-7,158E-02
-3,308E+13	-7,217E-02
-3,335E+13	-7,276E-02
-3,362E+13	-7,335E-02
-3,389E+13	-7,394E-02
-3,416E+13	-7,453E-02
-3,443E+13	-7,512E-02
-3,470E+13	-7,571E-02
-3,497E+13	-7,630E-02
-3,524E+13	-7,689E-02
-3,551E+13	-7,748E-02
-3,578E+13	-7,807E-02
-3,605E+13	-7,866E-02
-3,632E+13	-7,924E-02
-3,659E+13	-7,983E-02
-3,686E+13	-8,042E-02
-3,713E+13	-8,101E-02

-3,740E+13	-8,160E-02
-3,767E+13	-8,219E-02
-3,794E+13	-8,278E-02
-3,821E+13	-8,337E-02
-3,850E+13	-8,396E-02
-3,877E+13	-8,455E-02
-3,904E+13	-8,514E-02
-3,931E+13	-8,573E-02
-3,958E+13	-8,632E-02
-3,985E+13	-8,691E-02
-4,012E+13	-8,750E-02
-4,039E+13	-8,809E-02
-4,066E+13	-8,868E-02
-4,094E+13	-8,927E-02
-4,121E+13	-8,986E-02
-4,148E+13	-9,046E-02
-4,175E+13	-9,107E-02
-4,202E+13	-9,166E-02
-4,229E+13	-9,225E-02
-4,256E+13	-9,284E-02
-4,283E+13	-9,343E-02
-4,310E+13	-9,402E-02
-4,337E+13	-9,461E-02
-4,364E+13	-9,519E-02
-4,391E+13	-9,578E-02
-4,418E+13	-9,637E-02
-4,445E+13	-9,696E-02
-4,471E+13	-9,755E-02
-4,498E+13	-9,814E-02
-4,525E+13	-9,873E-02
-4,552E+13	-9,932E-02
-4,579E+13	-9,991E-02
-4,606E+13	-1,005E-01
-4,633E+13	-1,011E-01
-4,660E+13	-1,017E-01
-4,687E+13	-1,023E-01

-4,714E+13	-1,029E-01
-4,741E+13	-1,035E-01
-4,768E+13	-1,040E-01
-4,795E+13	-1,046E-01
-4,822E+13	-1,052E-01
-4,849E+13	-1,058E-01
-4,876E+13	-1,064E-01
-4,903E+13	-1,070E-01
-4,930E+13	-1,076E-01
-4,957E+13	-1,082E-01
-4,984E+13	-1,088E-01
-5,011E+13	-1,094E-01
-5,038E+13	-1,099E-01
-5,065E+13	-1,105E-01
-5,091E+13	-1,111E-01
-5,118E+13	-1,117E-01
-5,145E+13	-1,123E-01
-5,172E+13	-1,129E-01
-5,199E+13	-1,135E-01
-5,226E+13	-1,141E-01
-5,253E+13	-1,147E-01
-5,279E+13	-1,153E-01
-5,306E+13	-1,159E-01
-5,333E+13	-1,164E-01
-5,359E+13	-1,170E-01
-5,386E+13	-1,176E-01
-5,412E+13	-1,182E-01
-5,438E+13	-1,188E-01
-5,464E+13	-1,194E-01
-5,489E+13	-1,200E-01
-5,514E+13	-1,206E-01
-5,538E+13	-1,212E-01
-5,561E+13	-1,218E-01
-5,583E+13	-1,224E-01
-5,603E+13	-1,230E-01
-5,622E+13	-1,235E-01

-5,639E+13	-1,241E-01
-5,654E+13	-1,247E-01
-5,668E+13	-1,253E-01
-5,680E+13	-1,259E-01
-5,692E+13	-1,265E-01
-5,703E+13	-1,271E-01
-5,714E+13	-1,277E-01
-5,726E+13	-1,283E-01
-5,735E+13	-1,289E-01
-5,745E+13	-1,295E-01
-5,757E+13	-1,302E-01
-5,758E+13	-1,308E-01
-5,772E+13	-1,314E-01
-5,786E+13	-1,321E-01
-5,793E+13	-1,328E-01
-5,798E+13	-1,335E-01
-5,796E+13	-1,342E-01
-5,772E+13	-1,349E-01
-5,770E+13	-1,356E-01
-5,769E+13	-1,364E-01
-5,765E+13	-1,371E-01
-5,761E+13	-1,379E-01
-5,761E+13	-1,387E-01

Lampiran 2. Tabel Perhitungan Kekuatan Batas Kapal FPSO BKI menggunakan Metode NLFEA Kondisi *Sagging* dan *Hogging* (Hasil Olahan, 2024)

sagging		*hogging*	
Bending Moment	*Curvature*	*Bending Moment*	*Curvature*
0,000E+00	0,000E+00	0,000E+00	0,000E+00
-1,111E+12	-2,351E-03	1,250E+12	2,645E-03
-2,222E+12	-4,703E-03	2,500E+12	5,290E-03
-3,333E+12	-7,054E-03	3,750E+12	7,936E-03
-4,444E+12	-9,406E-03	5,000E+12	1,058E-02
-5,555E+12	-1,176E-02	6,250E+12	1,323E-02
-6,667E+12	-1,411E-02	7,500E+12	1,587E-02

-7,778E+12	-1,646E-02	8,750E+12	1,852E-02
-8,889E+12	-1,881E-02	1,000E+13	2,116E-02
-1,000E+13	-2,116E-02	1,125E+13	2,381E-02
-1,111E+13	-2,351E-02	1,250E+13	2,645E-02
-1,222E+13	-2,587E-02	1,375E+13	2,910E-02
-1,333E+13	-2,822E-02	1,500E+13	3,174E-02
-1,444E+13	-3,057E-02	1,625E+13	3,439E-02
-1,555E+13	-3,292E-02	1,750E+13	3,703E-02
-1,667E+13	-3,527E-02	1,875E+13	3,968E-02
-1,778E+13	-3,762E-02	2,000E+13	4,232E-02
-1,889E+13	-3,998E-02	2,125E+13	4,497E-02
-2,000E+13	-4,233E-02	2,250E+13	4,761E-02
-2,111E+13	-4,468E-02	2,375E+13	5,026E-02
-2,222E+13	-4,703E-02	2,500E+13	5,290E-02
-2,333E+13	-4,938E-02	2,625E+13	5,554E-02
-2,444E+13	-5,173E-02	2,750E+13	5,819E-02
-2,555E+13	-5,409E-02	2,875E+13	6,083E-02
-2,666E+13	-5,644E-02	3,000E+13	6,348E-02
-2,777E+13	-5,879E-02	3,125E+13	6,612E-02
-2,889E+13	-6,114E-02	3,250E+13	6,877E-02
-3,000E+13	-6,349E-02	3,375E+13	7,141E-02
-3,111E+13	-6,585E-02	3,500E+13	7,406E-02
-3,252E+13	-6,883E-02	3,625E+13	7,670E-02
-3,377E+13	-7,148E-02	3,750E+13	7,935E-02
-3,488E+13	-7,383E-02	3,875E+13	8,199E-02
-3,599E+13	-7,618E-02	4,000E+13	8,463E-02
-3,710E+13	-7,853E-02	4,125E+13	8,728E-02
-3,821E+13	-8,088E-02	4,250E+13	8,992E-02
-3,932E+13	-8,324E-02	4,375E+13	9,257E-02
-4,043E+13	-8,559E-02	4,500E+13	9,521E-02
-4,154E+13	-8,794E-02	4,625E+13	9,786E-02
-4,265E+13	-9,029E-02	4,750E+13	1,005E-01
-4,376E+13	-9,265E-02	4,875E+13	1,032E-01
-4,487E+13	-9,500E-02	5,000E+13	1,058E-01
-4,598E+13	-9,735E-02	5,124E+13	1,084E-01
-4,709E+13	-9,971E-02	5,249E+13	1,111E-01

-4,820E+13	-1,021E-01	5,373E+13	1,138E-01
-4,931E+13	-1,044E-01	5,495E+13	1,164E-01
-5,042E+13	-1,068E-01	5,608E+13	1,193E-01
-5,152E+13	-1,091E-01	5,693E+13	1,224E-01
-5,263E+13	-1,115E-01	5,730E+13	1,250E-01
-5,373E+13	-1,139E-01	5,731E+13	1,250E-01
-5,482E+13	-1,163E-01	5,731E+13	1,250E-01
-5,585E+13	-1,188E-01	5,732E+13	1,250E-01
-5,668E+13	-1,215E-01	5,732E+13	1,251E-01
-5,743E+13	-1,248E-01	5,735E+13	1,251E-01
-5,804E+13	-1,277E-01	5,738E+13	1,252E-01
-5,861E+13	-1,307E-01	5,742E+13	1,253E-01
-5,928E+13	-1,341E-01	5,744E+13	1,253E-01
-5,968E+13	-1,366E-01	5,749E+13	1,254E-01
-6,033E+13	-1,404E-01	5,755E+13	1,256E-01
-6,088E+13	-1,438E-01	5,763E+13	1,257E-01
-6,129E+13	-1,467E-01	5,767E+13	1,258E-01
-6,182E+13	-1,500E-01	5,770E+13	1,260E-01
-6,215E+13	-1,528E-01	5,783E+13	1,266E-01
-6,270E+13	-1,562E-01	5,795E+13	1,272E-01
-6,313E+13	-1,594E-01	5,808E+13	1,278E-01
-6,356E+13	-1,627E-01	5,837E+13	1,292E-01
-6,397E+13	-1,659E-01	5,839E+13	1,294E-01
-6,436E+13	-1,692E-01	5,839E+13	1,294E-01
-6,476E+13	-1,725E-01		
-6,505E+13	-1,759E-01		
-6,524E+13	-1,778E-01		
-6,537E+13	-1,800E-01		
-6,536E+13	-1,803E-01		
-6,537E+13	-1,803E-01		
-6,539E+13	-1,803E-01		
-6,535E+13	-1,802E-01		
-6,535E+13	-1,802E-01		

Lampiran 3. Tabel Perhitungan Kekuatan Batas Kapal FPSO IACS menggunakan Metode NLFEA Kondisi *Sagging* dan *Hogging* (Hasil Olahan, 2024)

sagging		*hogging*	
Bending Moment	*Curvature*	*Bending Moment*	*Curvature*
0,000E+00	0,000E+00	0,000E+00	0,000E+00
-1,111E+12	-2,286E-03	1,000E+12	2,057E-03
-2,222E+12	-4,571E-03	2,000E+12	4,114E-03
-3,333E+12	-6,857E-03	3,000E+12	6,171E-03
-4,444E+12	-9,143E-03	4,000E+12	8,228E-03
-5,555E+12	-1,143E-02	5,000E+12	1,028E-02
-6,667E+12	-1,371E-02	6,000E+12	1,234E-02
-7,778E+12	-1,600E-02	7,000E+12	1,440E-02
-8,889E+12	-1,829E-02	8,000E+12	1,646E-02
-1,000E+13	-2,057E-02	9,000E+12	1,851E-02
-1,111E+13	-2,286E-02	1,000E+13	2,057E-02
-1,222E+13	-2,514E-02	1,100E+13	2,263E-02
-1,333E+13	-2,743E-02	1,200E+13	2,468E-02
-1,444E+13	-2,971E-02	1,300E+13	2,674E-02
-1,555E+13	-3,200E-02	1,400E+13	2,880E-02
-1,667E+13	-3,429E-02	1,500E+13	3,085E-02
-1,778E+13	-3,657E-02	1,600E+13	3,291E-02
-1,889E+13	-3,886E-02	1,700E+13	3,497E-02
-2,000E+13	-4,114E-02	1,800E+13	3,702E-02
-2,111E+13	-4,343E-02	1,900E+13	3,908E-02
-2,222E+13	-4,572E-02	2,000E+13	4,114E-02
-2,333E+13	-4,800E-02	2,100E+13	4,319E-02
-2,444E+13	-5,029E-02	2,200E+13	4,525E-02
-2,555E+13	-5,257E-02	2,300E+13	4,731E-02
-2,666E+13	-5,486E-02	2,400E+13	4,936E-02
-2,777E+13	-5,715E-02	2,500E+13	5,142E-02
-2,889E+13	-5,943E-02	2,600E+13	5,348E-02
-3,000E+13	-6,172E-02	2,700E+13	5,553E-02
-3,111E+13	-6,400E-02	2,800E+13	5,759E-02
-3,222E+13	-6,629E-02	2,900E+13	5,965E-02
-3,363E+13	-6,919E-02	3,000E+13	6,170E-02
-3,488E+13	-7,176E-02	3,100E+13	6,376E-02

-3,599E+13	-7,405E-02	3,200E+13	6,582E-02
-3,710E+13	-7,634E-02	3,300E+13	6,787E-02
-3,821E+13	-7,862E-02	3,400E+13	6,993E-02
-3,932E+13	-8,091E-02	3,500E+13	7,199E-02
-4,043E+13	-8,319E-02	3,600E+13	7,404E-02
-4,154E+13	-8,548E-02	3,700E+13	7,610E-02
-4,265E+13	-8,777E-02	3,800E+13	7,815E-02
-4,376E+13	-9,005E-02	3,900E+13	8,021E-02
-4,487E+13	-9,234E-02	4,000E+13	8,227E-02
-4,598E+13	-9,463E-02	4,101E+13	8,432E-02
-4,709E+13	-9,692E-02	4,201E+13	8,638E-02
-4,820E+13	-9,921E-02	4,300E+13	8,844E-02
-4,931E+13	-1,015E-01	4,400E+13	9,049E-02
-5,042E+13	-1,038E-01	4,500E+13	9,255E-02
-5,153E+13	-1,061E-01	4,600E+13	9,461E-02
-5,263E+13	-1,084E-01	4,700E+13	9,667E-02
-5,374E+13	-1,107E-01	4,800E+13	9,872E-02
-5,484E+13	-1,130E-01	4,900E+13	1,008E-01
-5,592E+13	-1,153E-01	5,000E+13	1,028E-01
-5,692E+13	-1,178E-01	5,100E+13	1,049E-01
-5,771E+13	-1,206E-01	5,199E+13	1,070E-01
-5,845E+13	-1,237E-01	5,299E+13	1,090E-01
-5,906E+13	-1,267E-01	5,398E+13	1,111E-01
-5,961E+13	-1,294E-01	5,497E+13	1,132E-01
-6,023E+13	-1,326E-01	5,594E+13	1,153E-01
-6,069E+13	-1,352E-01	5,685E+13	1,175E-01
-6,117E+13	-1,381E-01	5,759E+13	1,199E-01
-6,165E+13	-1,409E-01	5,810E+13	1,223E-01
-6,214E+13	-1,440E-01	5,872E+13	1,244E-01
-6,266E+13	-1,472E-01	5,914E+13	1,268E-01
-6,309E+13	-1,501E-01	5,939E+13	1,279E-01
-6,355E+13	-1,532E-01	5,954E+13	1,299E-01
-6,394E+13	-1,560E-01	5,954E+13	1,305E-01
-6,435E+13	-1,588E-01	5,955E+13	1,305E-01
-6,473E+13	-1,618E-01	5,957E+13	1,305E-01
-6,518E+13	-1,651E-01	5,961E+13	1,305E-01

-6,552E+13	-1,681E-01	5,961E+13	1,306E-01
-6,595E+13	-1,713E-01	5,964E+13	1,306E-01
-6,626E+13	-1,742E-01	5,966E+13	1,306E-01
-6,664E+13	-1,773E-01	5,966E+13	1,306E-01
-6,687E+13	-1,803E-01	5,969E+13	1,307E-01
-6,722E+13	-1,836E-01	5,970E+13	1,308E-01
-6,744E+13	-1,870E-01	5,971E+13	1,309E-01
-6,773E+13	-1,903E-01	5,978E+13	1,312E-01
-6,790E+13	-1,937E-01	5,985E+13	1,314E-01
-6,817E+13	-1,968E-01	5,996E+13	1,319E-01
-6,827E+13	-2,000E-01	6,005E+13	1,322E-01
-6,851E+13	-2,028E-01	6,018E+13	1,328E-01
-6,816E+13	-2,026E-01	6,035E+13	1,337E-01
-6,814E+13	-2,025E-01	6,058E+13	1,348E-01
-6,814E+13	-2,025E-01	6,080E+13	1,360E-01
		6,104E+13	1,376E-01
		6,104E+13	1,376E-01
		6,105E+13	1,377E-01
		6,106E+13	1,377E-01
		6,107E+13	1,377E-01
		6,108E+13	1,377E-01
		6,110E+13	1,378E-01
		6,112E+13	1,380E-01
		6,112E+13	1,380E-01
		6,120E+13	1,385E-01
		6,120E+13	1,385E-01
		6,120E+13	1,385E-01
		6,120E+13	1,385E-01
		6,120E+13	1,385E-01
		6,120E+13	1,385E-01
		6,121E+13	1,385E-01
		6,121E+13	1,385E-01
		6,122E+13	1,385E-01
		6,123E+13	1,385E-01
		6,127E+13	1,386E-01
		6,127E+13	1,386E-01