

## SUMMARY

# ANALISA BEBAN IMPACT AKIBAT TRAWL GEAR PADA PIPA BAWAH LAUT

IMPACT ANALYSIS ON SUBMARINE PIPELINE CAUSED BY TRAWL GEAR

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**Subject** : Pipa

**Keyword** : Pipeline ; Trawl Gear ; Impact ; Dent

### Description :

Dalam operasionalnya, struktur pipa bawah laut terkena beban internal dan beban eksternal. Salah satu dari beban eksternal yang mengenai struktur pipa adalah beban impact, yang disebabkan oleh kejatuhan dan benturan oleh suatu benda asing. Penelitian ini membahas mengenai pengaruh beban impact akibat trawl gear pada pipa bawah laut. Bentuk kerusakan yang terjadi pada pipa akibat beban impact tersebut adalah dent yang diakibatkan oleh ketidakmampuan material pipa dalam menahan tekanan. Penelitian ini akan dilakukan dengan memodelkan struktur pipa dan pembebanannya dengan menggunakan software ANSYS LS-DYNA versi 8.0. Standar yang digunakan dalam melakukan pemodelan tersebut adalah DNV 2000 OS-F101 Submarine Pipe System. Jenis trawl gear yang digunakan dalam pemodelan pembebanan impact adalah Dutch beam trawl dan UK-Belgian beam trawl dengan konfigurasi smallest, mean, dan largest. Sedangkan struktur pipa yang dimodelkan adalah yang memiliki diameter 0.4046m dengan dua variasi wall thickness yaitu 0.0157m dan 0.0182m. Hasil dari penelitian ini didapatkan bahwa semua pipa mengalami kegagalan akibat impact yang disimulasikan, karena rasio antara kedalaman dent dengan diameter pipa melebihi kriteria DnV, yaitu minimum 0.035 padahal rasio hasil simulasi minimum 0.342. Sedangkan Bentuk dent yang terjadi adalah elips dengan kedalaman minimum 0.1390 m dan maksimum 0.2903 m yang terjadi di tengah bentangan pipa.

### Description Alt:

During operational condition, submarine pipeline is affected by internal and external loading. Impact load is one of external loading taken place on submarine pipeline due to dropping and/or colliding objects. In this research, analyzes of impact load effects caused by trawl gear on submarine pipeline has been performed according to the DNV 2000 OS-F101 Submarine Pipe System. Dent is main failure mode of impact load on pipeline due to stresses greater than material strength. Software package ANSYS LSDYNA ver.8.0. is used for modeling pipeline geometries and load cases. Type of trawls used for modeling impact load are Dutch and UK-Belgian beam trawl with smallest, mean and largest configuration. The pipeline models have 0.4046m outside diameter with variation of wall thickness of 0.0157m and 0.0182m. The results show that all submarine pipeline fail due to simulated impact load, because the ratio of dent depth and outside diameter above the criteria stated in DnV, which is the minimum value is 0.035 while the result is 0.342. Shape of dent is elliptical geometry with minimum depth 0.1390 m and maximum 0.2903 that is located on the middle of pipeline.

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**Date Create** : 27/11/2008

**Type** : Text

**Format** : pdf

**Language** : Indonesian

**Identifier** : ITS-Undergraduate-3100007030110  
**Collection** : 3100007030110  
**Call Number** : RSKe 621.867 2 Mur a  
**Source** : Undergraduate Theses of Ocean Engineering Department, RSKe 621.867 2 Mur a, 2007  
**COverage** : ITS Community  
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Thank You,

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