

## Accepted Manuscript

Evaluation of crack propagation behaviors in a T-shaped tubular joint employing tetrahedral FE modeling

Kazuhisa Yagi, Satoyuki Tanaka, Takahiro Kawahara, Kanta Nihei, Hiroshi Okada, Naoki Osawa

PII: S0142-1123(16)30399-1  
DOI: <http://dx.doi.org/10.1016/j.ijfatigue.2016.11.028>  
Reference: JIJF 4143

To appear in: *International Journal of Fatigue*

Received Date: 3 July 2016  
Revised Date: 17 November 2016  
Accepted Date: 18 November 2016

Please cite this article as: Yagi, K., Tanaka, S., Kawahara, T., Nihei, K., Okada, H., Osawa, N., Evaluation of crack propagation behaviors in a T-shaped tubular joint employing tetrahedral FE modeling, *International Journal of Fatigue* (2016), doi: <http://dx.doi.org/10.1016/j.ijfatigue.2016.11.028>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



# Evaluation of crack propagation behaviors in a T-shaped tubular joint employing tetrahedral FE modeling

Kazuhisa Yagi<sup>a,e</sup>, Satoyuki Tanaka<sup>b</sup>, Takahiro Kawahara<sup>b</sup>,  
Kanta Nihei<sup>c</sup>, Hiroshi Okada<sup>d</sup>, Naoki Osawa<sup>e</sup>

<sup>a</sup>*Sanoyas Shipbuilding Corporation,  
2767-21, Shionasu, Kojima, Kurashiki, 711-8588, Japan,  
e-mail: k-yagi@sanoyas.co.jp*

<sup>b</sup>*Graduate School of Engineering, Hiroshima University,  
4-1, Kagamiyama 1-chome, Higashi-Hiroshima, 739-8527, Japan,  
e-mail: satoyuki@hiroshima-u.ac.jp; m146691@hiroshima-u.ac.jp*

<sup>c</sup>*Kawasaki Technology Co., Ltd., 1 Kawasaki-cho 3-chome,  
Akashi, 673-0014, Japan, e-mail: nihei.kanta@khi.co.jp*

<sup>d</sup>*Department of Mechanical Engineering, Faculty of Science and Technology,  
Tokyo University of Science, 2641 Yamazaki, Noda, 278-8510, Japan,  
e-mail: hokada@rs.noda.tus.ac.jp*

<sup>e</sup>*Department of Naval Architecture and Ocean Engineering,  
Osaka University, 2-1, Yamadaoka, Suita, 565-0871, Japan,  
e-mail: osawa@naoe.eng.osaka-u.ac.jp*

---

## Abstract

Crack growth in a T-shaped tubular joint is studied using a newly developed system to simulate three-dimensional crack propagation and fatigue testing results. Tetrahedral finite element (FE) modeling is adopted to analyze a tubular structure with a curved surface crack. The virtual crack closure-integral method is used to evaluate the fracture mechanics parameters. The FE crack modeling with a remeshing procedure using an automated mesh generation system greatly simplifies the crack propagation simulation. The calculation results are compared with the experiments.

*Keywords:* Tubular joint, Fracture mechanics, Crack propagation simulation, Finite elements, Fatigue testing

---

## 1. Introduction

Steel pipes and tubular joints are commonly employed as onshore and offshore structural members in applications such as bridges, airports, rigs, and

Download English Version:

<https://daneshyari.com/en/article/5015175>

Download Persian Version:

<https://daneshyari.com/article/5015175>

[Daneshyari.com](https://daneshyari.com)