

# LAPORAN AKHIR

## SKEMA

### HIBAH GURU BESAR



#### OPTIMASI DESAIN CRASH BOX BI-TUBULAR PADA PEMBEBANAN AKSIAL QUASI STATIC

Diusulkan oleh:

**Ketua** : Prof. Dr.Eng. Anindito Purnowidodo, ST., M.Eng  
**Anggota** : Dr.Eng. Moch. Agus Choiron, ST., MT.  
Prof. Ir. Djarot B. Darmadi, MT., PhD.  
Ismi choirotin, ST., MT.

Dibiayai oleh:

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**FAKULTAS TEKNIK  
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**HALAMAN PENGESAHAN**

**LAPORAN AKHIR**

Judul : OPTIMASI DESAIN CRASH BOX BI-TUBULAR PADA PEMBEBANAN AKSIAL QUASI STATIC

**Peneliti/Pelaksana**  
Nama Lengkap : Prof. Dr.Eng. ANINDITO PURNOWIDODO, ST., M.Eng.  
Perguruan Tinggi : Universitas Brawijaya  
NIDN : 0010037107  
Jabatan Fungsional : Guru Besar  
Program Studi : -  
Nomor HP : 085791489665  
Alamat surel (e-mail) : anindito@ub.ac.id

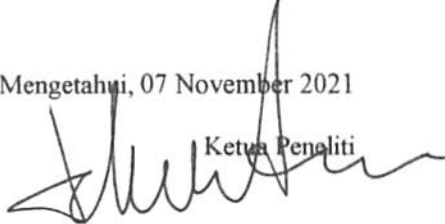
**Anggota (1)**  
Nama Lengkap : Dr. Eng. MOCH. AGUS CHOIRON, ST., MT.  
NIDN : 0017087204  
Perguruan Tinggi : Universitas Brawijaya

**Anggota (2)**  
Nama Lengkap : Prof. Ir. DJAROT B. DARMADI, MT., Ph.D.  
NIDN : 0018056705  
Perguruan Tinggi : Universitas Brawijaya  
Tahun Pelaksanaan : Tahun ke 1 dari rencana 1 tahun  
Biaya Tahun Berjalan : Rp 100,000,000.00  
Biaya Keseluruhan : Rp 100,000,000.00



Mengetahui, 07 November 2021

Ketua Peneliti



Prof. Dr.Eng. ANINDITO  
PURNOWIDODO, ST., M.Eng.  
NIDN. 0010037107

1. Judul Penelitian : Optimasi Desain Crash Box Bi-Tubular Pada Pembebanan Aksial Quasi Static

2. Ketua Peneliti

- a. Nama Lengkap : Dr. Anindito Purnowidodo
- b. Bidang Keahlian : Kekuatan Material
- c. Jabatan Struktural : IVa/Pembina
- d. Jabatan Fungsional : Guru Besar
- e. Unit Kerja : Teknik Mesin UB
- f. Alamat surat : Teknik Mesin UB, Jl. MT. Haryono 167, Malang
- g. Telepon/Fax : (0341) 554291
- h. E-mail : Anindito@ub.ac.id

3. Anggota Peneliti

No	Nama dan Gelar Akademik	Bidang Keahlian	Intansi	Alokasi waktu (jam/minggu)
1	Dr.Eng Moch. Agus Chiron, ST., MT.	Optimasi Desain	Teknik Mesin UB	6
2	Prof., Ir. Djarot B Darmadi, MT., Ph.D.	Teknologi Pengelasan	Teknik Mesin UB	6
3	Ismi choirotin, ST., MT.	Industri Manufaktur	Mahasiswa Program S3 TM UB	

4. Obyek Penelitian : Pengembangan Desain Crash Box

5. Masa Pelaksanaan penelitian :

- a. Mulai : Mei 2021
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## RINGKASAN

Crash box merupakan alat keselamatan pasif yang difungsikan untuk mengurangi tingkat keparahan yang dialami penumpang saat terjadi tabrakan. Salah satu desain crash box yang dikembangkan adalah tabung dengan desain bergelombang (*corrugated tube*) yang didesain untuk mengatasi masalah *initial peak force* yang tinggi dan membuat proses deformasi terprediksi dan terkontrol. Penyerapan energi yang rendah pada struktur tabung bergelombang dapat ditingkatkan dengan penggunaan tabung ganda. Dengan latar belakang tersebut, maka dalam penelitian ini akan dilakukan penelitian terhadap karakteristik *crash box* dengan menggunakan tabung ganda (*bi-tubular*) dan permukaan bergelombang (*corrugation surface*) akibat pembebanan aksial *quasi static*. Penelitian ini bertujuan untuk mengetahui karakteristik penyerapan energi pada *bi-tubular corrugated crash box* terhadap pembebanan aksial *quasi static* dan mendapatkan optimum desainnya. Metode penelitian menggunakan *software* berbasis metode elemen hingga dan metode optimasi menggunakan *Response Surface Methodology* (RSM). Parameter desain yang digunakan berupa Diameter Dalam ( $d$ ), Panjang Gelombang ( $W$ ) dan Amplitudo ( $A$ ) pada crash box Bi-Tubular dengan setiap parameter terdiri dari 3 level sehingga dihasilkan matrik pemodelan sejumlah 36 model. Uji tekan kuasi statik ini menggunakan *load cell* yang disetting pada *Universal Testing Machine*. Data hasil uji eksperimen berupa besar penyerapan energi serta pola deformasi dijadikan dasar validasi, yang nantinya akan dibandingkan dengan hasil simulasi. Setelah proses validasi diterima, maka proses pemodelan dalam penelitian ini dapat dilakukan. Adapun parameter simulasi yang digunakan mengikuti kode standar ANSYS 18.1 *software*.

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