CURRICULUM VITAE

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AFFILIATION

M.S Candidate (2024.03. ~ Current)

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EDUCATION

2018.03-2004.02	B.S	Mechanical engineering	Keimyung university

MASTER RESEARCH

"Development of an Optimal Design for Vibration Testing Fixtures Using Grids"

A vibration-test fixture must deliver shaker excitation to the test specimen with high stiffness and low mass; however, the increasing size of modern automotive headlamps makes it difficult to secure sufficiently high natural frequencies. This study proposes an automated fixture-design framework that extends grid-based topology optimization and incorporates manufacturability constraints using a genetic algorithm (GA). Finite-element models are automatically generated from headlamp geometry and mounting-point data, and optimization yields lightweight structures satisfying the natural-frequency requirement (≥ 500 Hz). Testing on three industrial fixtures (A, B, and C) showed consistent convergence to a cross-shaped rib layout around mounting points and revealed up to 37.5% mass reduction and 36% reduction in computation time, while empirical manual design failed to meet the target for Fixture C. The results demonstrate that the proposed method provides a reliable and practical approach to fixture design, improving structural performance, reducing development effort, and offering strong industrial applicability for large automotive headlamp vibration testing.

RESEARCH INTERESTS

- Optimization

INTERNATIONAL PUBLICATIONS (SCI Publication: 6, In preparation: 2)

1. J.H.Back, J.B.Bae, J.H.Kang, and J.J.Kim, "Comparing Bolt Implementation Methods in Vibration Testing for Accurate Dynamic Behavior Analysis", Applied Sciences, vol. 15, no. 2, pp. 505, 2025.

   (JCR-IF-2023: 2.5, Rank-Engineering, Multidisciplinary: 44/181, Top 24.0%)

DOMESTIC PUBLICATIONS (KCI Accepted: 3, In preparation: 0)

1. J.H.Back, J.A.Baik, J.J.Kim, "Evaluation of Applicability of Optimal Design for Various Vehicle Headlamp Vibration Test Jigs", Journal of the Korea Academia-Industrial cooperation Society, vol. 26, no. 4, pp. 35-43, 2025

2. J.H.Back and J.J.Kim, "Comparative Analysis of Bolt Simplification Methods in Static and Dynamic Analyses," Journal of the Korean Society of Manufacturing Process Engineering, vol. 23, no. 6, pp. 57-65, 2024

AWARDS

1. Keimyung University Best Thesis Award, 2023

PATENTS (Registration KR: 0, US: 0, EU:)

INTERNATIONAL CONFERENCE

DOMESTIC CONFERENCE

1. 백종혁, 김수민, 강지혜, 김정진, "최적설계 기반 차량 헤드램프용 리브형 지그의 고유진동수 회피 및 경량화", 한국CDE학회 2024년 동계 학술대회
2. 백종혁, 백지아, 최준원, 김정진, "진동 시험용 볼트의 모델링에 따른 정적 및 동적 거동의 비교 분석 연구", 대한기계학회 CAE 및 응용역학부문 2024년 춘계학술대회
3. 백종혁, 김정진, "진동 시험용 지그의 고유진동수 회피 및 경량화를 위한 최적화 알고리즘 비교", 대한기계학회 학술대회

GRANTS AND CONTRACTS (PI: 0, CI:0, RA: 3)

1. RA: “진동 시험용 지그의 최적설계를 위한 GUI 기반 자동화 프로그램 개발”, 01/2025 ~ 11/2025, 90,000,000KRW
2. RA: “구조해석 기반 3차원 테리안 프레임의 성능 평가 및 구조 최적화”, 09/2024 ~ 12/2024, 30,000,000KRW
3. RA: “진동/충격 지그 최적설계 자동화 프로그램 개발,” ㈜ 에스엘, 03/2024~12/2024, 77,000,000KRW
4. RA: “고유진동수 회피 및 경량화를 위한 시험용 지그 최적설계,” ㈜ 에스엘, 05/2023~12/2023, 49,500,000KRW

*PI: Principal Investigator, Co-I: Co-Investigator, RA: Research Assistant