

# **ResearchNote**

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1/1/23

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**Centrifuge Test**

**FE Analysis**

**Ambient Vibrations**

**Part I**

**Centrifuge Test**

# **1 Background**

## **1.1 Limitations of the Centrifuge Test**

## **1.2 Failures due to scour**

## 2 Test Setup

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### 2.1 Background

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## 3 Material Properties

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### 3.1 Background

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## 4 Scale Law

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### 4.1 Background

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## 5 Analysis

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### 5.1 Background

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## 6 Verification

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### 6.1 Background

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## 7 References

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### 7.1 Background

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# **Part II**

## **FE Analysis**

## 8 Background

This is a book created from markdown and executable code.

### 8.1 Background

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## 9 Numerical Setup

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### 9.1 Background

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## 10 Material Calibration

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### 10.1 Background

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# 11 Verification

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## 11.1 Background

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# 12 Analysis

This is a book created from markdown and executable code.

## 12.1 Background

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## 13 Validation

This is a book created from markdown and executable code.

### 13.1 Background

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## 14 References

This is a book created from markdown and executable code.

### 14.1 Background

This is a book created from markdown and executable code. `### third toc` `## Test Setup` This is a book created from markdown and executable code. `### third toc` `## OMA` This is a book created from markdown and executable code. `## Statistical Analysis` This is a book created from markdown and executable code. `## Damage Detection` This is a book created from markdown and executable code. `## Validation` This is a book created from markdown and executable code. `## References` `### third toc`

**Part III**

**Ambient Vibrations**

# 15 Background

This is a book created from markdown and executable code.

## 15.1 Background

This is a book created from markdown and executable code. `### third toc` `## Test Setup` This is a book created from markdown and executable code. `### third toc` `## OMA` This is a book created from markdown and executable code. `## Statistical Analysis` This is a book created from markdown and executable code. `## Damage Detection` This is a book created from markdown and executable code. `## Validation` This is a book created from markdown and executable code. `## References` `### third toc`

## 16 Test Setup

This is a book created from markdown and executable code.

### 16.1 Background

This is a book created from markdown and executable code. `### third toc` `## Test Setup` This is a book created from markdown and executable code. `### third toc` `## OMA` This is a book created from markdown and executable code. `## Statistical Analysis` This is a book created from markdown and executable code. `## Damage Detection` This is a book created from markdown and executable code. `## Validation` This is a book created from markdown and executable code. `## References` `### third toc`



# 17 OMA

This is a book created from markdown and executable code.

## 17.1 Background

This is a book created from markdown and executable code. `### third toc` `## Test Setup` This is a book created from markdown and executable code. `### third toc` `## OMA` This is a book created from markdown and executable code. `## Statistical Analysis` This is a book created from markdown and executable code. `## Damage Detection` This is a book created from markdown and executable code. `## Validation` This is a book created from markdown and executable code. `## References` `### third toc`

# 18 Statistical Analysis

This is a book created from markdown and executable code.

## 18.1 Background

This is a book created from markdown and executable code. `### third toc` `## Test Setup` This is a book created from markdown and executable code. `### third toc` `## OMA` This is a book created from markdown and executable code. `## Statistical Analysis` This is a book created from markdown and executable code. `## Damage Detection` This is a book created from markdown and executable code. `## Validation` This is a book created from markdown and executable code. `## References` `### third toc`

# 19 Damage Detection

This is a book created from markdown and executable code.

## 19.1 Background

This is a book created from markdown and executable code. `### third toc` `## Test Setup` This is a book created from markdown and executable code. `### third toc` `## OMA` This is a book created from markdown and executable code. `## Statistical Analysis` This is a book created from markdown and executable code. `## Damage Detection` This is a book created from markdown and executable code. `## Validation` This is a book created from markdown and executable code. `## References` `### third toc`

## 20 Validation

This is a book created from markdown and executable code.

## 21 References

This is a book created from markdown and executable code.

# **Part IV**

# **Proposal**

# 22 Proposal

## 22.0.1 Soil Choice

- Material model choice
  - Mohr-Coulomb Model
  - Hardening Mohr-Coulomb Model
  - Cyclic SANISAND Model
- Young's modulus and Poisson ratio
- Critical State Properties
- Nonlinear Parameters
- cohesion and tensile properties
- Cyclic strength parameters

## 22.0.2 Structure Choice

- Rigid or Linear Elastic Material
- Young's modulus and Poisson ratio
- Fatigue properties (SN Curve)
- Hardness properties (BHN)

## 22.0.3 SSI Choice

- Interface friction coefficient
  - Horizontal / Vertical
- Modulus of subgrade reaction of soil
  - Horizontal / Vertical / Rotational

#### **22.0.4 Loading Choice**

- Static Loading [[Pasted image 20230205154905.png]]
- Cyclic Loading [[Pasted image 20230205154927.png]]

[[Pasted image 20230205154840.png]]

- Vibration Loading

#### **22.0.5 Software Choice**

- ABAQUS
  - UMAT implementation
- Plaxis 3D
- ARTeMIS Modal Pro
  - Operational Modal Analysis
  - Structural Health Monitoring
- SAP 2000
  - natural frequency for 3D structure on Winkler foundation

### **22.1 Verification Plan**

- Winkler model limitations
- Mass-spring model limitations
- Accelerometer locations
- Sensor Sensitivity and Capacity