ISO 21955:2021 (E)

Acoustics — Experimental method for transposition of dynamic forces generated by an active component from a test bench to a receiving structure

Contents

Foreword

Introduction

- 1 Scope
- 2 Normative references
- 3 Terms and definitions
- 4 Principle of the method of transposition of the dynamic force
 - 4.1 General matters
 - 4.2 General formulae
 - 4.3 Geometrical considerations
- 5 Operating mode
 - 5.1 General
 - 5.2 Synopsis of procedure
 - 5.3 Tasks and preliminary operations
 - 5.4 Transfer matrices determination
 - 5.4.1 General
 - 5.4.2 Final receiving structure transfer matrix determination Y RS
 - 5.4.3 Test bench transfer matrix determination, Y TB
 - 5.4.4 Connecting device spring-like matrix properties determination, S I
 - 5.4.5 Active Component transfer matrix determination, Y AC
 - 5.5 Measured dynamic forces transmitted to the test bench
 - 5.6 Predicted dynamic forces transmitted to the final structure
 - 5.6.1 General
 - 5.6.2 Strong decoupling
 - 5.6.3 Very similar bench and receiving structure
 - 5.6.4 Case of a rigid receiving structure
 - 5.6.4.1 General
 - 5.6.4.2 Rigid test bench (marble)
 - 5.6.4.3 Non- rigid test bench
 - 5.6.5 Case of a non-rigid receiving structure
 - 5.6.5.1 General
 - 5.6.5.2 Rigid test bench (marble)
 - 5.6.5.3 Non-rigid test bench
 - 5.6.5.4 Evaluation of the quality of the predicted forces
- 6 Requirements for data in test report
 - 6.1 Specification of the integrator to the supplier
 - 6.2 Data sent by the supplier to the integrator
- Annex A (informative) Theoretical developments
 - A.1 Introduction
 - A.2 Components formulae
 - A.3 Total system formulae
 - A.4 Transposition to dynamic forces

Annex B (informative) Frequency response functions measurement

- B.1 General
- B.2 Measurement of transfer functions a f

- B.2.1 Implementation and fixtures
- B.2.1.1 General
- B.2.1.2 Assembly 1 One single 3D accelerometer by attachment point.
- B.2.1.3 Assembly 2 Using multiple 3D anchor accelerometers by attachment point
- B.2.2 Recommendations

Annex C (informative) Dynamic forces measurement

- C.1 General
- C.2 Direct method by force sensor
- C.2.1 Test set-up and fixture
- C.2.2 Preliminary measurements of force/force transfers
- C.2.2.1 General
- C.2.2.2 Recommendations
- C.2.2.3 Equipment used
- C.3 Indirect method: calculation from accelerometer measurements
- C.3.1 Principle
- C.3.2 Implementation and fixtures
- C.3.2.1 Assembly 1
- C.3.2.2 Assembly 2
- C.3.2.3 Assembly 3
- C.3.3 Recommendations
- C.4 Method of dynamic stiffness
- C.4.1 Principle
- C.4.2 Implementation and fixtures
- C.4.3 Recommendations

Annex D (informative) Data processing

- D.1 General
- D.2 Direct measurement (see C.1)
- D.3 Indirect method (see C.2)
- D.4 Transfer matrices for dynamic force prediction

Annex E (informative) Study of a wiper system

- E.1 General description of the case study
- E.2 Transfer matrices measurement
- E.3 Direct measurement of the dynamic forces on test bench
- E.4 Validation of estimated dynamic forces on bench
- E.5 Estimated dynamic forces on vehicle
- E.5.1 Prediction results
- E.5.2 Validation of estimated dynamic force on bench

Annex F (informative) Equivalent force torsor and block-sensor method

- F.1 Description of the method
- F.1.1 General
- F.1.2 Theoretical principles
- F.1.3 Smart receiver for identification the "block-sensor"
- F.1.4 Selection of measurement parameters
- F.1.5 Equivalent coupling point and transfer matrix
- F.1.5.1 Acceleration at the coupling equivalent coupling point γ C , matrix H v
- F.1.5.2 Force at the coupling equivalent coupling point F ecp
- F.2 Measurement procedure
- F.2.1 General
- F.2.2 Step 1: Suspend the receiver
- F.2.3 Step 2: Sensor localization optimization and installation
- F.2.4 Step 3: measurement of the receiver accelerance
- F.2.5 Step 4: coupling of the source to the receiver
- F.2.6 Step 5-6-7: Measurement of the assembly mobility
- F.2.7 Step 8: Calculation of the active component mobility
- F.2.8 Step 9: Measurement of the operational accelerations
- F.2.9 Step10: Calculation of blocked forces
- F.3 Autovalidation

Page count: 58