



**Airlines for America**  
We Connect the World

**MPIG**

## ***NDT meets MSG-3***



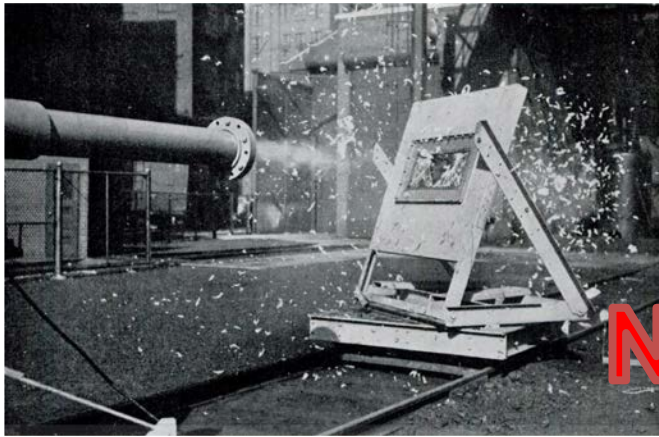
September 27, 2022

**Manny Gdalevitch** B.Eng\MBA

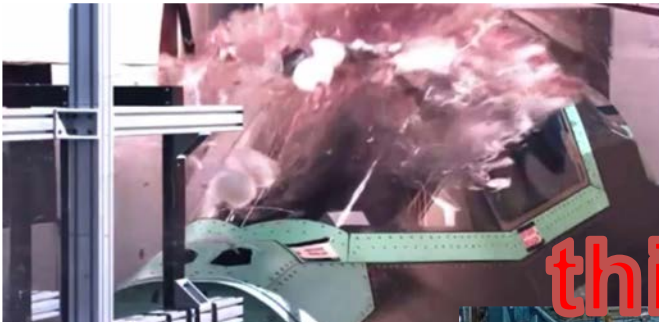
***Consultants Aeronovo Inc.***

**[mannyg@aeronovo.ca](mailto:mannyg@aeronovo.ca)** T. 15146097320

# Background



**Destructive  
or  
Non-Destructive**



**this is the question**



## Destructive?

A method of inspection that subjects the material, component or assembly to destructive tests, which provides information about the performance of that test object.

The disadvantage of destructive testing is that, as the name implies, the test object is destroyed in the process.

*An example of DT will be endurance testing for landing gear or pitch trim actuator. Shooting birds to an engine or windshield will be another example. For structures it will be breaking the wing or inducing cracks in selected structural items.*

# NDT

---

Non-Destructive?

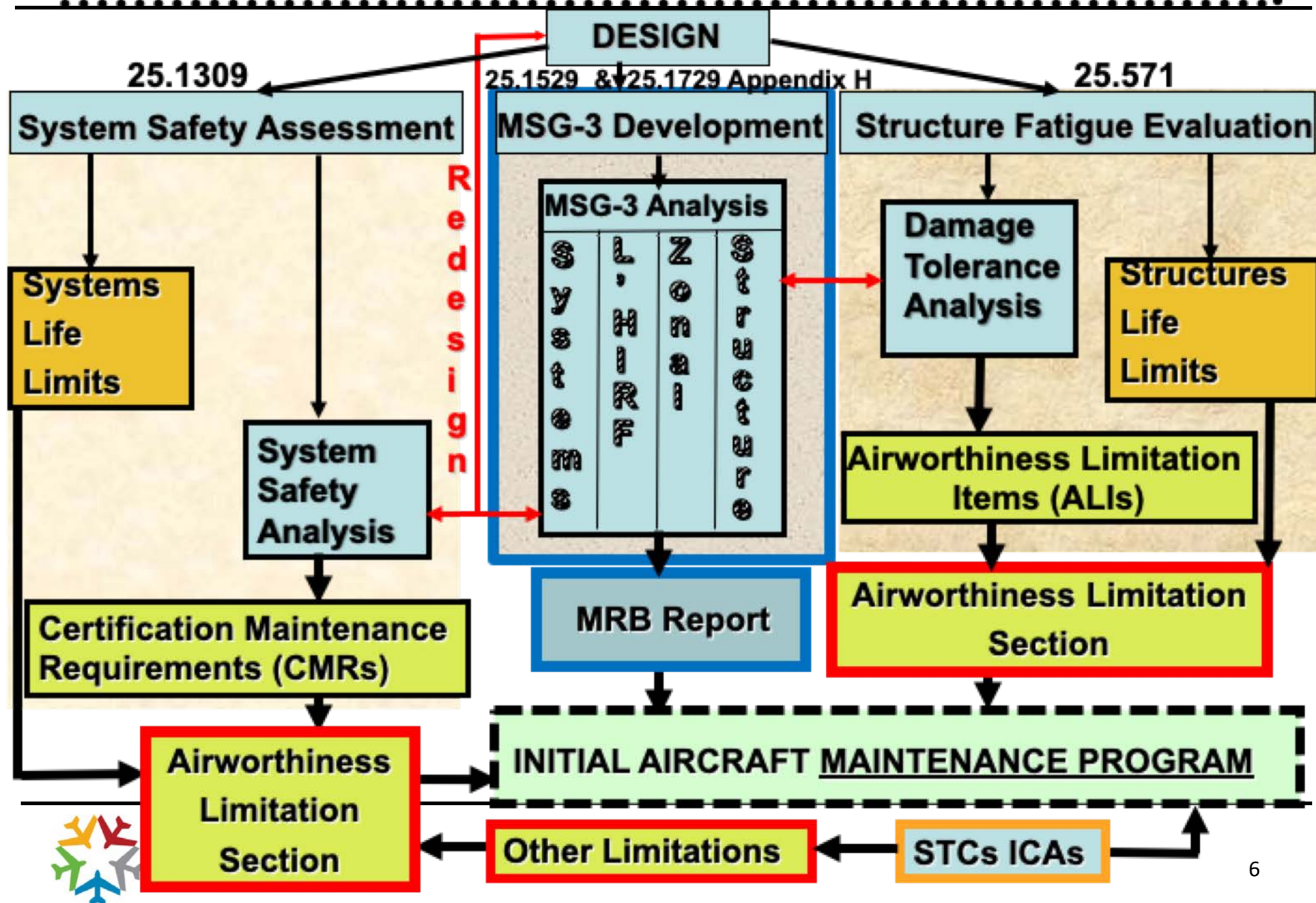
**NDT is defined as inspections, tests, or evaluations which may be applied to a structure or component to determine its integrity, composition, electrical or thermal properties, or dimensions without causing a change in any of these characteristics.**



## **MSG-3    ????**

- **Maintenance Steering Group - 3 (MSG-3)**
- **Methodology to develop ICAs**
- **Task oriented approach to sustains the inherent reliability and safety of the aircraft.**
- **Mitigating Functional Failures for: Safety, Operational and Economic consequences**
- **MSG-3 will analyze: Systems MSIs, Structures SSIs, Zonal ZINs and L'HIRF LHSIs**

# Initial Scheduled Maintenance Requirements



# **NDT**

---

## **MSG-3 ????? continue**

- **MSG has evolved through 16 revisions from 1968 to 2018.**
- **MSG-3 next Rev 2022.1 will include number of important changes including AHM.**
- **MSG-3 is the best acceptable approach to develop scheduled maintenance for fixed wing and rotor craft.**

# NDT *for MSG-3 tasks*

---

## **MSG-3 Tasks Pallet:**

Lubrication/Service (LU/SV or LUB/SVC)

Operational/Visual Check (OP/VC or OPC/VCK)

Inspection/Functional Check (IN\*/FC or IN\*/FNC)

General Visual Inspection (GV or GVI)

Detailed Inspection (DI or DET)

**Special Detailed Inspection (SI or SDI)**

Restoration (RS or RST)

Discard (DS or DIS)



# NDT *for MSG-3 tasks*

---

## Special Detailed Inspection (SI or SDI) as Specified in the NDT Manual or Maintenance Manual

Borescope Inspections for engine and structures

Tapping test for composite components

Penetrate crack inspection

Eddy Current

Ultrasound

Infrared Imaging/Thermography

*Details on above inspections and other methods can be found in  
FAA-H-8083-30A Aviation Technician Handbook*

## *NDT for MSG-3 tasks*

---

### **Special Detailed Inspection (SI or SDI) as Specified in the NDT Manual**

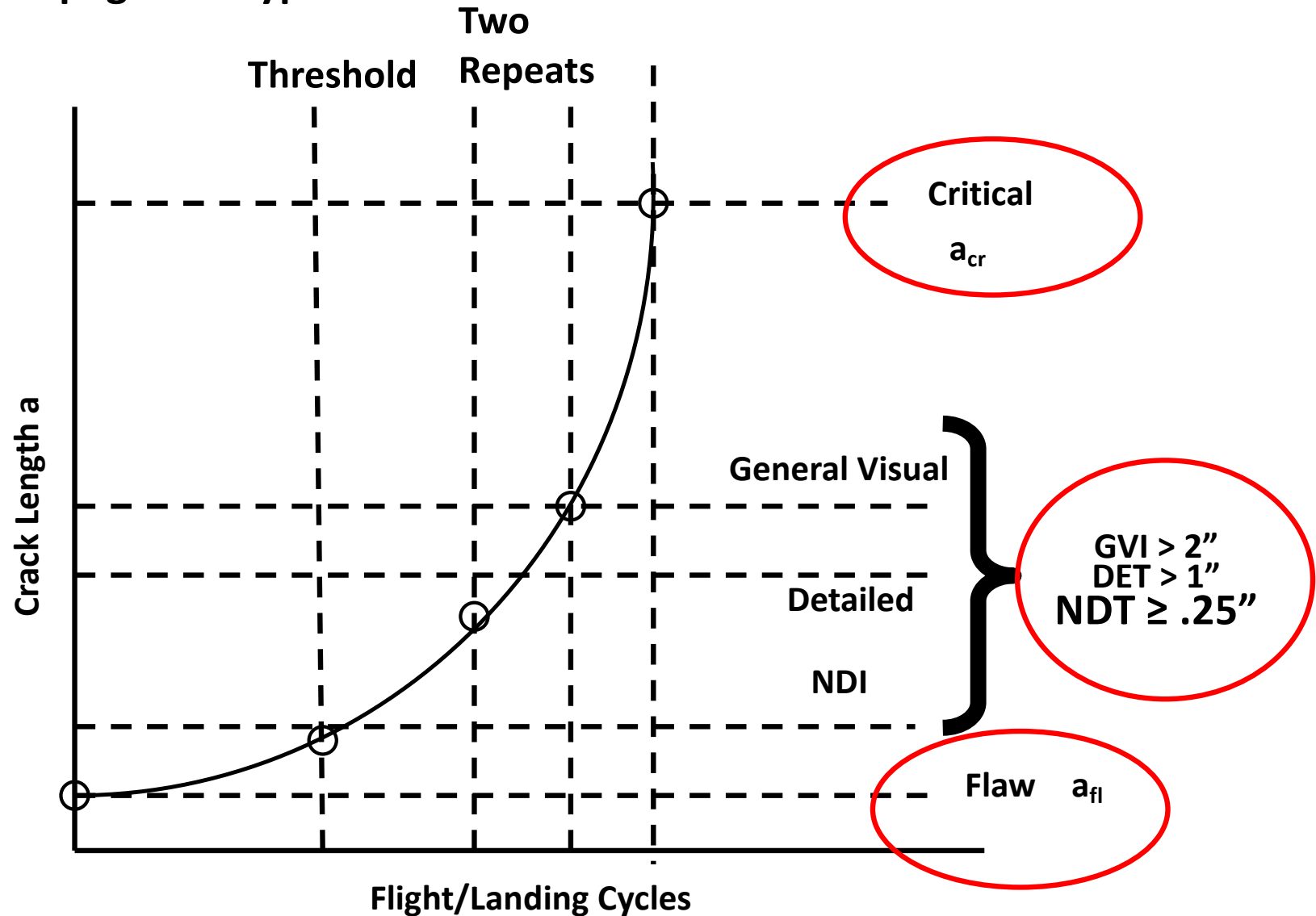
NDT Inspections to address damage tolerance requirements

**Requires inspection specimens/standards**



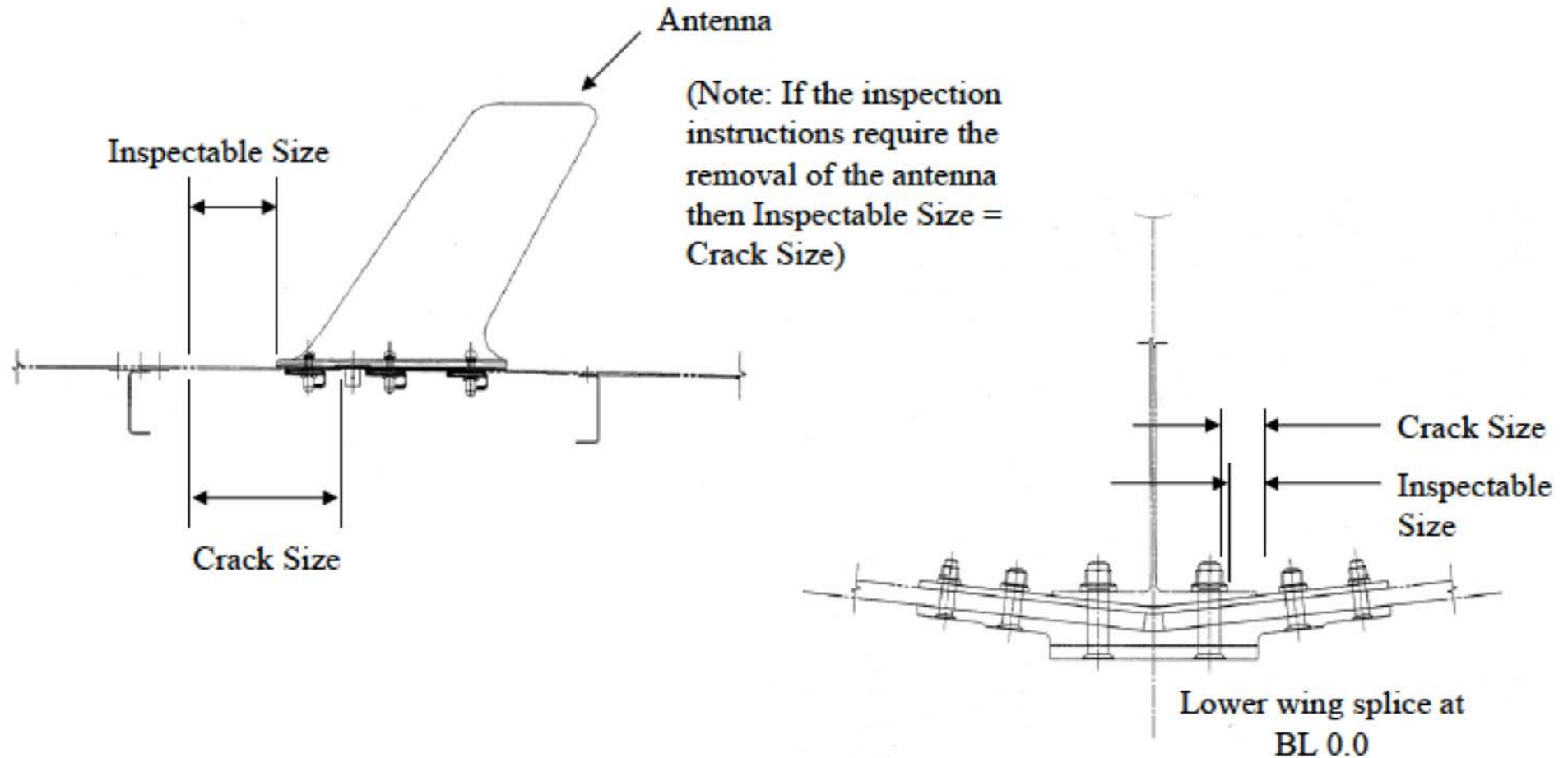
# DAMAGE TOLERANCE & FD

## Crack Propagation Typical Curve



# Typical Inspection

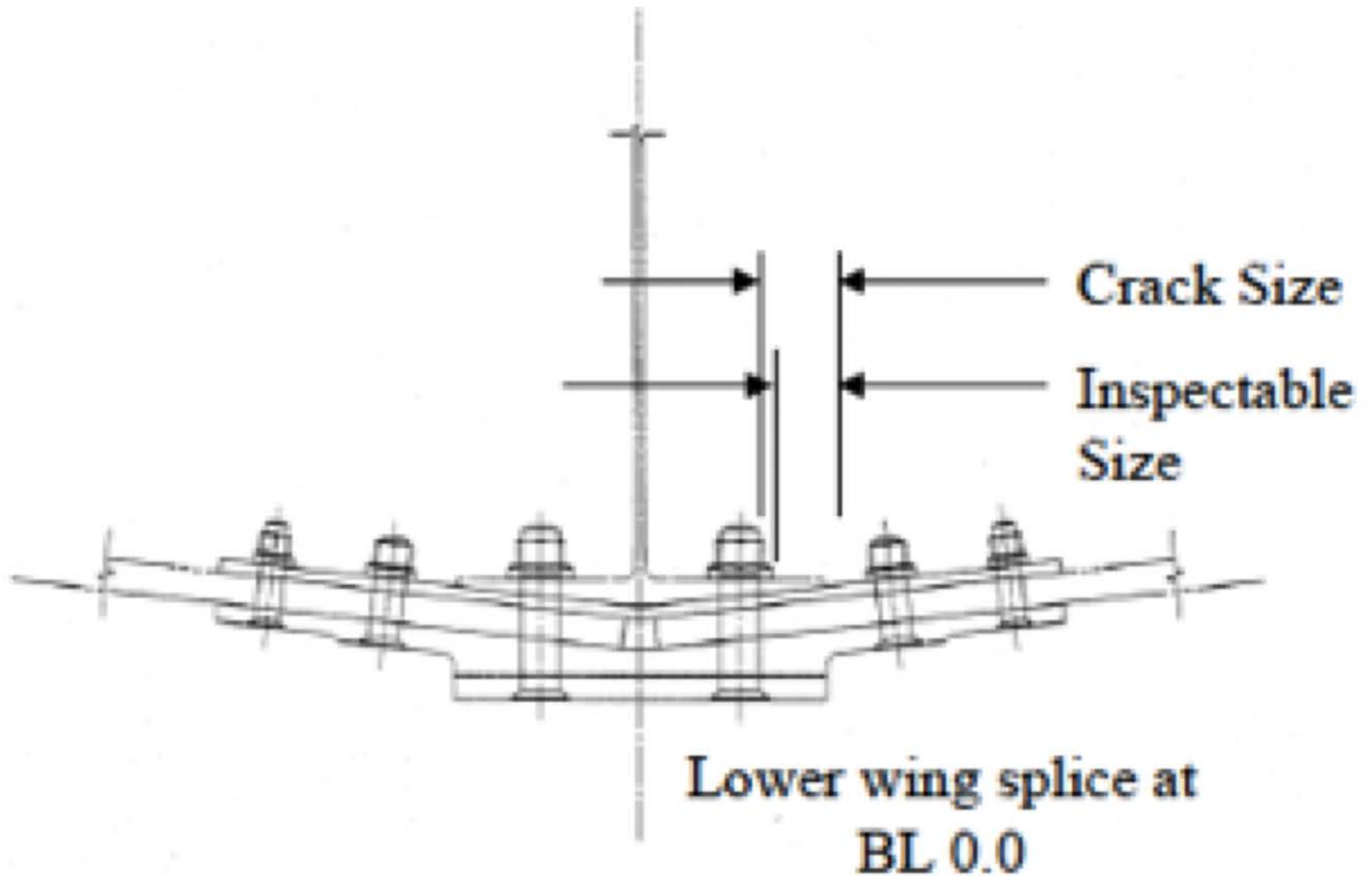
## Example of Initial and Inspectable Flaw Sizes





# Inspection Specimen/Standard

---



# NDT Inspection Specimen/Standard

---

## **Reference standards serve two purposes:**

- to provide an ultrasonic response pattern that is related to the part being inspected and
- to establish the required inspection sensitivity.

**The reference standard** contains a simulated defect (notch) that is positioned to provide a calibration signal representative of the expected defect. The notch size is chosen to establish inspection sensitivity (response to the expected defect size).

## **NDT Specimens/Standards are contained in the NTD Manual**

# NDT Manual

---

NDT manual is the manufacturer's approved manual to execute the ND Inspections:

- It contains the instructions, procedures and illustrations
- The identified specimen
- The specific equipment to use including probes
- Links to other manuals (AMM, SRM, ITEM etc.)

# References

---

## References for NDT:

ATA Specification 105  
ISO 9712  
MIL-STD-410E  
SNT-TC-1A  
AIA-NAS-410  
AC 65-31B  
AC 65-33A  
AC 43.13-1B  
AC 25-29

## References for MSG-3:

ATA Specification 105  
ATA MSG-3 Rev 2018.1  
AC 121-22C  
AC 120-16G  
AC 120-17B  
AC 120-42  
AC 25-19A  
AC 20-107  
AC 20-136  
AC 20-158  
AC 25-27A  
AC 27-1  
AC 29-2





**Airlines for America™**

We Connect the World

**Questions?**

**Thank you.**