ATTACHMENT 4

AIRWORTHINESS GROUP CHAIRMAN'S FACTUAL REPORT

DCA16FA217

CFM CFM56-7B Southwest ESN 874112 Event – Fan Case Analysis dated January 19, 2017

The Power of Flight

CFM56-7B Southwest ESN874112 event FAN CASE ANALYSIS

01/19/2017

FAN BLADE FRAGMENTATION SEQUENCE

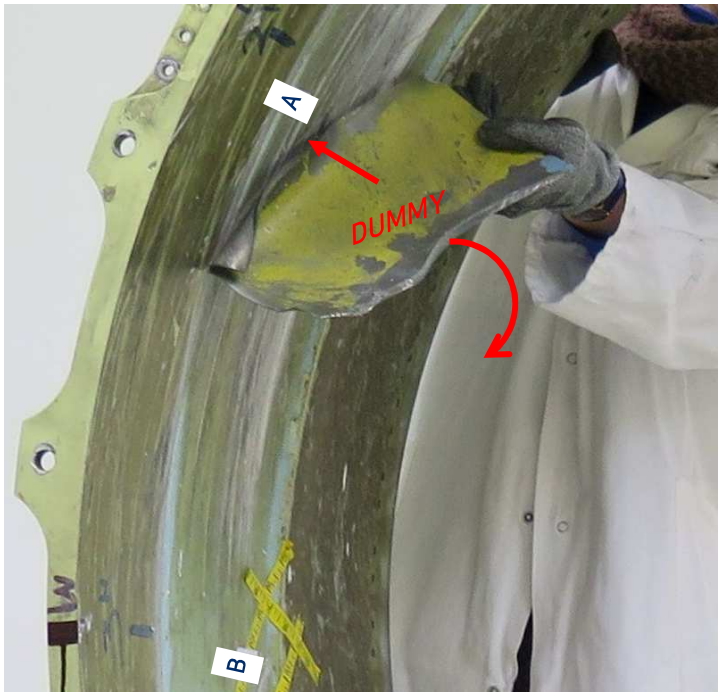
BLADE # 23
TIP PANEL TRAJECTORY

CFM56-7 N°874112

SOUTHWEST

FLA view

Tip panel impact 1
1 st contact

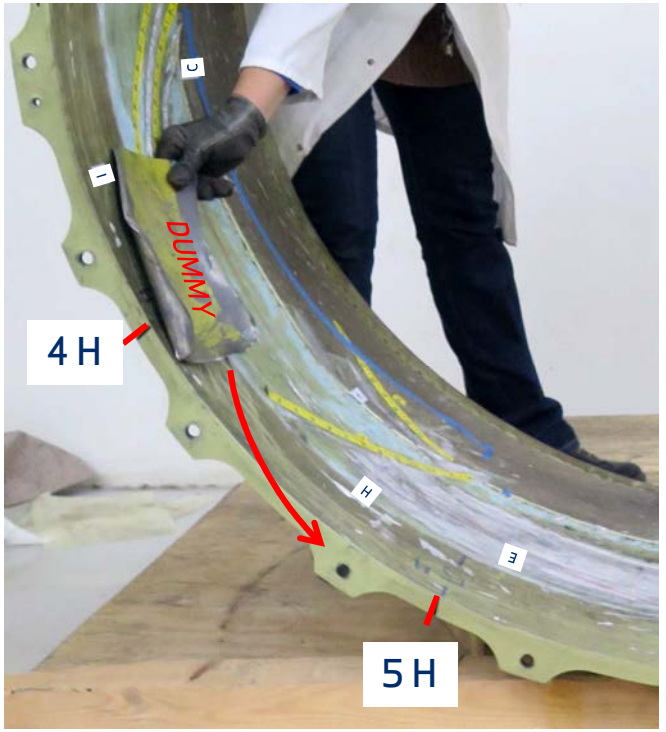


Preliminary data based on non validated assumption

CFM56-7 N°874112

SOUTHWEST

FLA view

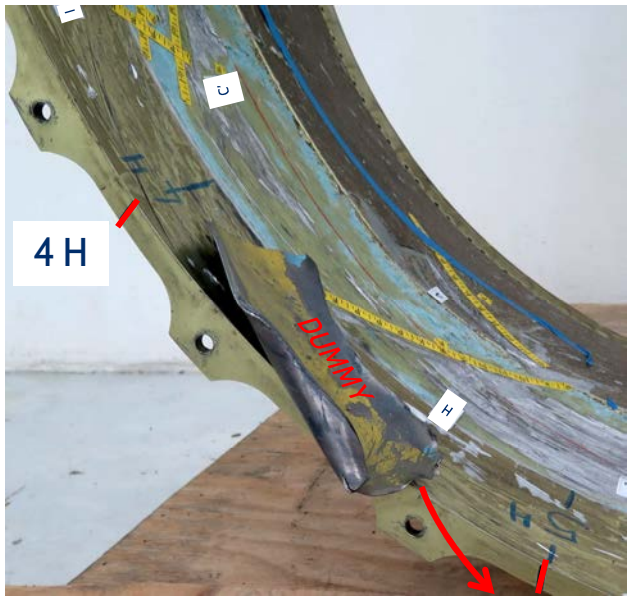


Preliminary data based on non validated assumption

CFM56-7 N°874112

SOUTHWEST

FLA view



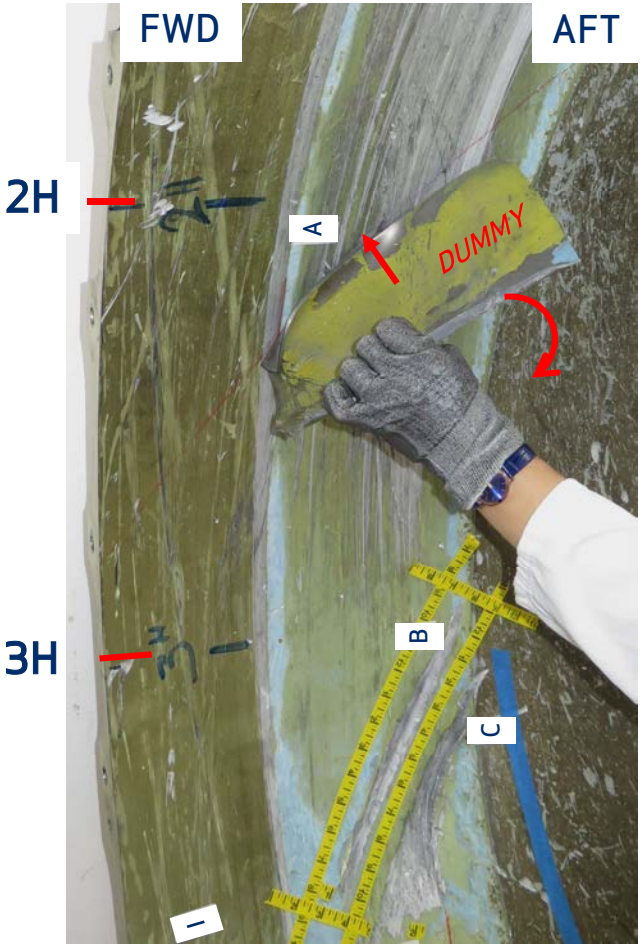
Tip panel was exited between 4H & 5H

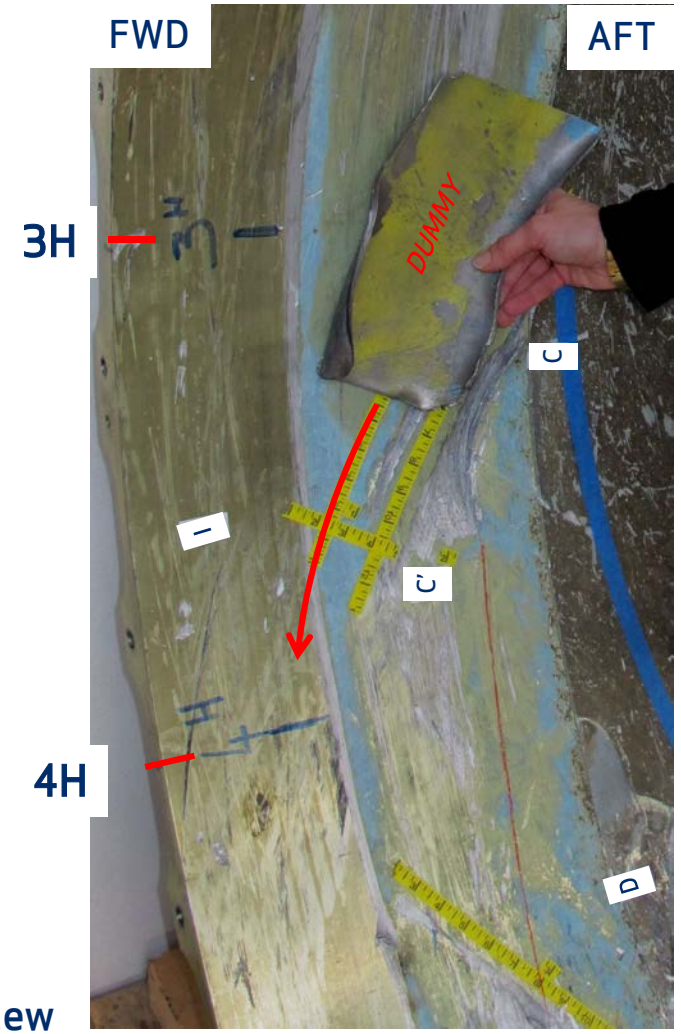
Preliminary data based on non validated assumption

CFM56-7 N°874112

SOUTHWEST

FAN BLADE # 23 TIP PANEL TRAJECTORY





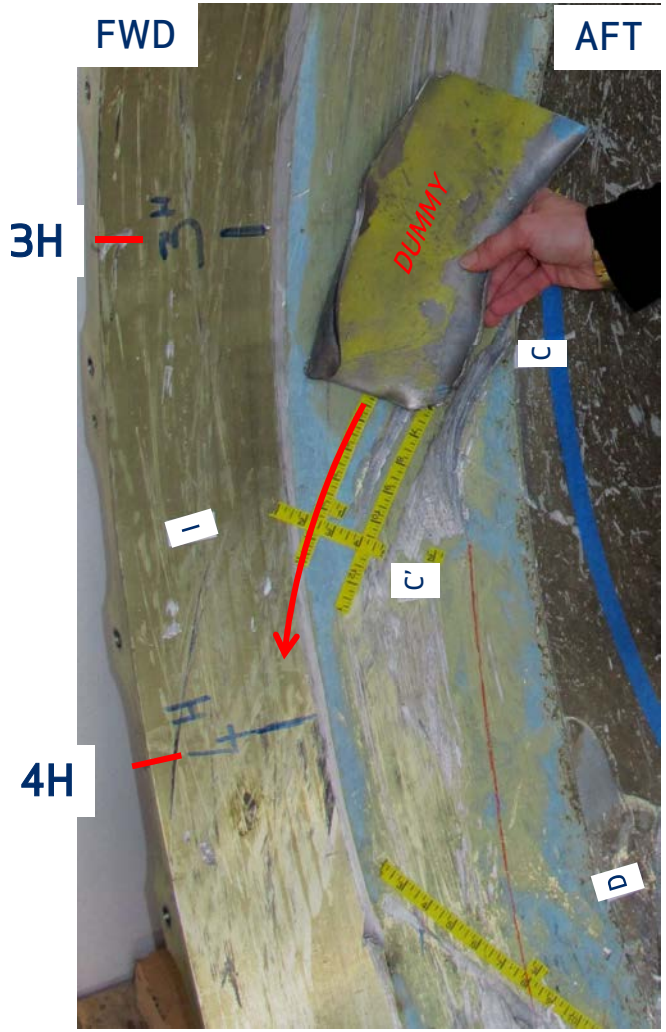
FAN case inner view

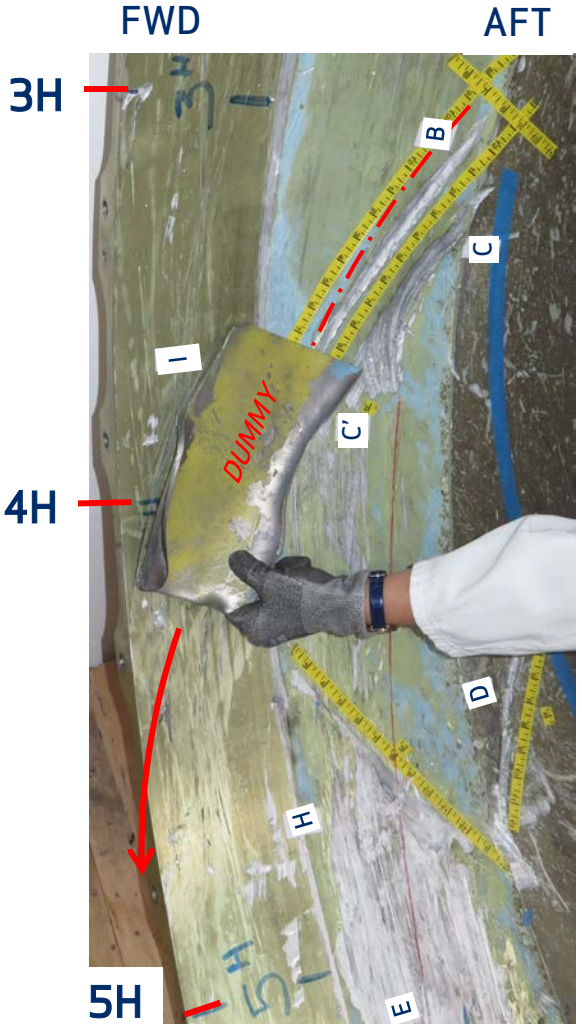
Preliminary data based on non validated assumption

CFM56-7 N°874112

SOUTHWEST

FAN BLADE # 23 TIP PANEL TRAJECTORY





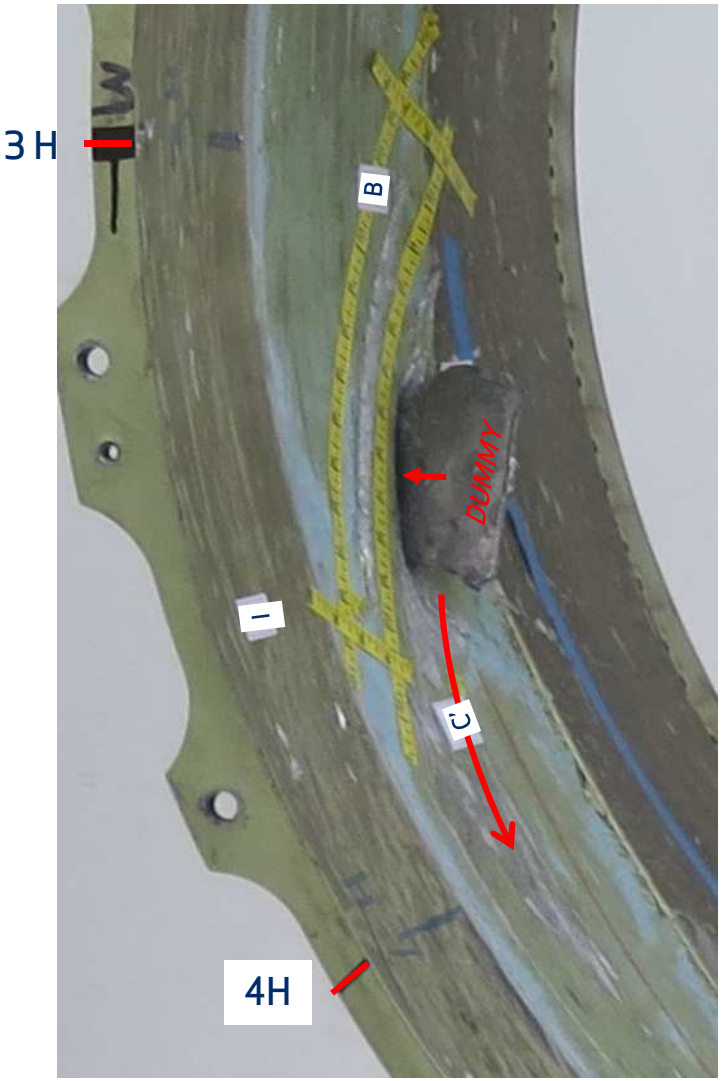
FAN case inner view

Preliminary data based on non validated assumption

BLADE # 23
MID SPAN FRAGMENT TRAJECTORY

CFM56-7 N°874112

SOUTHWEST

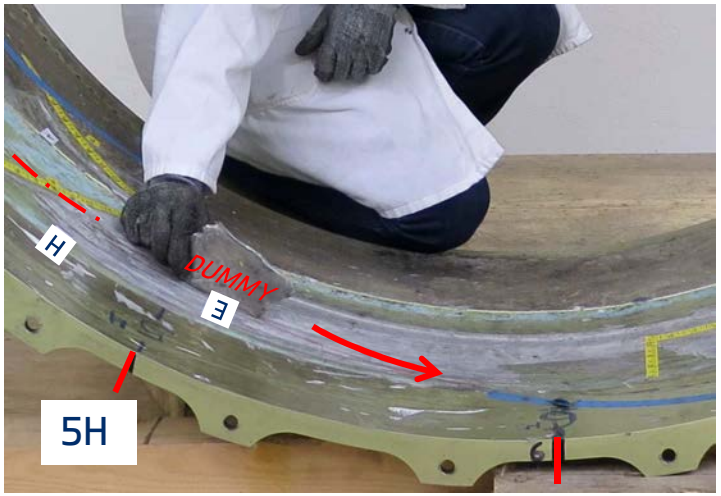


Preliminary data based on non validated assumption

CFM56-7 N°874112

SOUTHWEST

FLA view

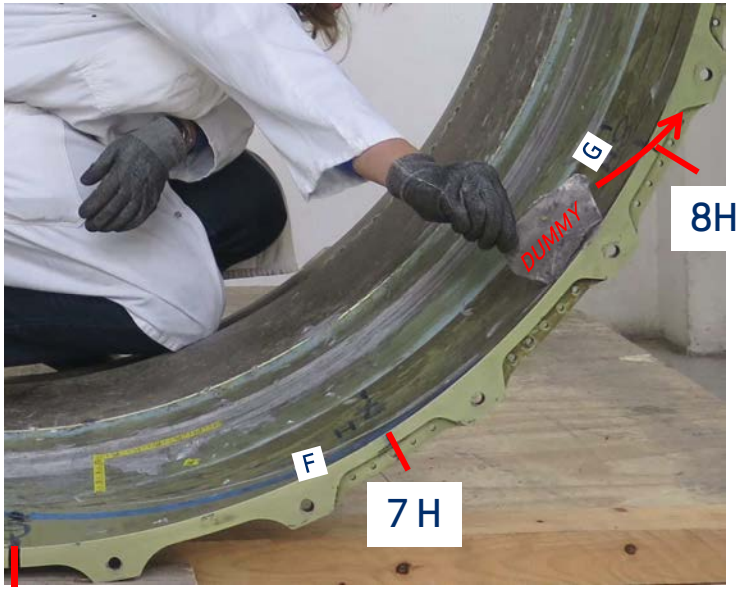


Preliminary data based on non validated assumption

CFM56-7 N°874112

SOUTHWEST

FLA view



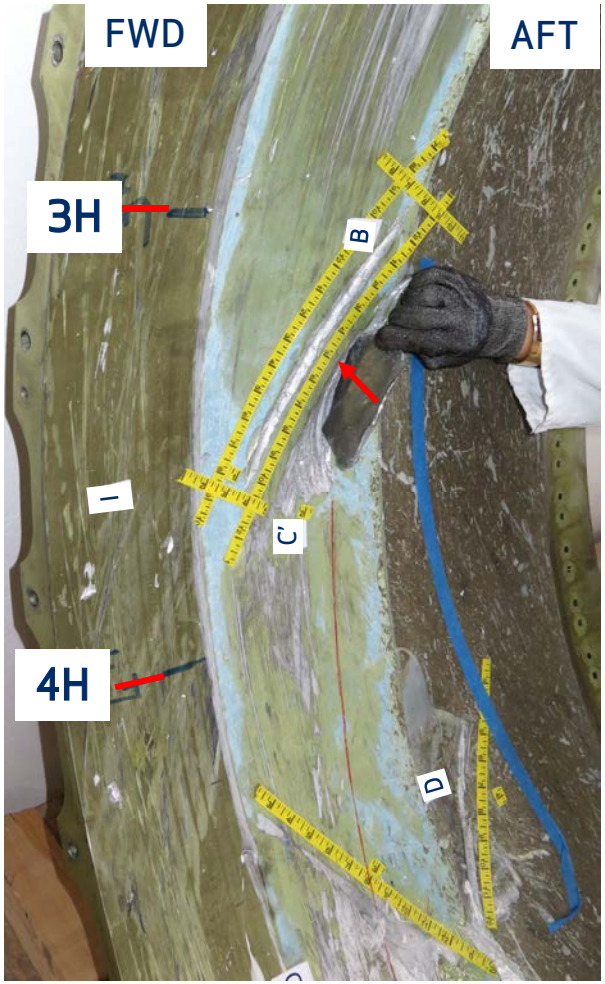
Mid span fragment was exited at 8H

Preliminary data based on non validated assumption

CFM56-7 N°874112

SOUTHWEST

FAN BLADE # 23 MID SPAN FRAGMENT TRAJECTORY



FAN case inner view

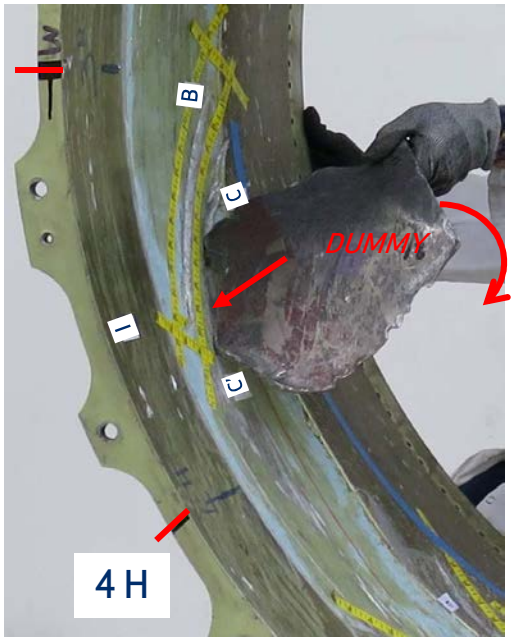
Preliminary data based on non validated assumption

BLADE # 23
ROOT BLADE TRAJECTORY

CFM56-7 N°874112

SOUTHWEST

FLA view

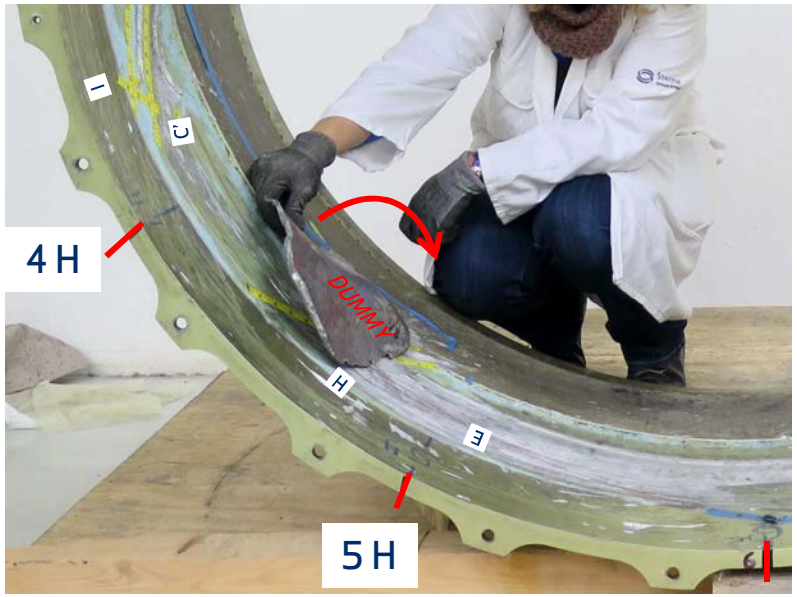


Preliminary data based on non validated assumption

CFM56-7 N°874112

SOUTHWEST

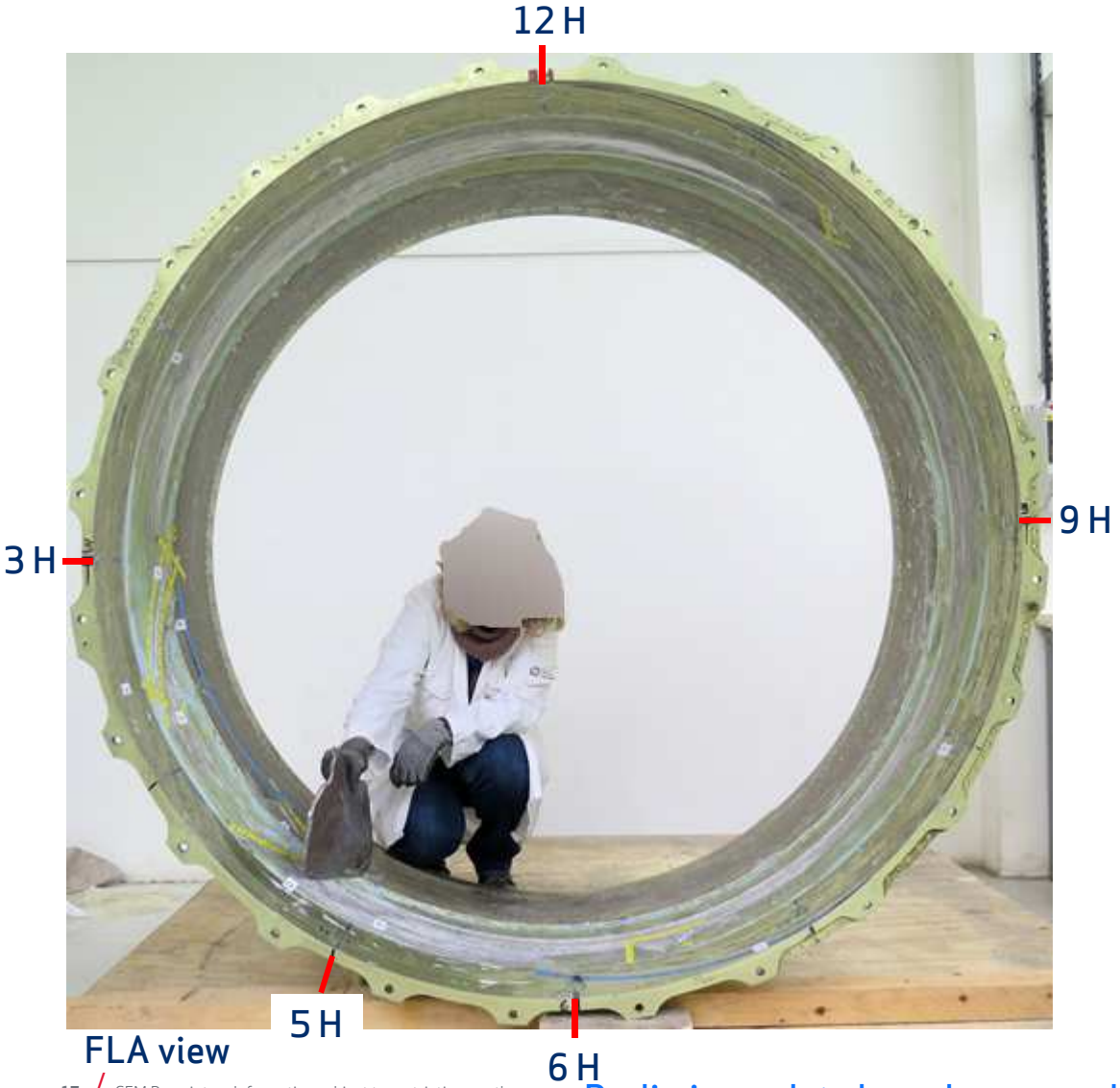
FLA view



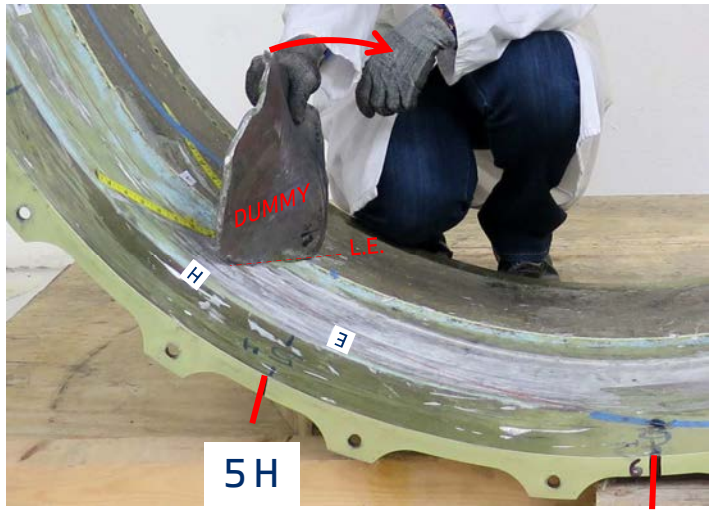
Preliminary data based on non validated assumption

CFM56-7 N°874112

SOUTHWEST



FLA view

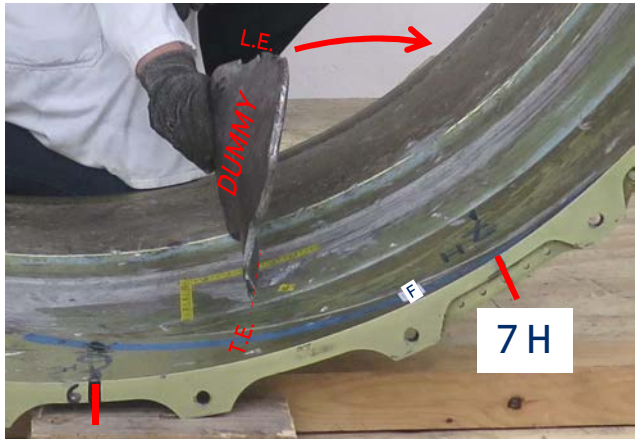


Preliminary data based on non validated assumption

CFM56-7 N°874112

SOUTHWEST

FLA view

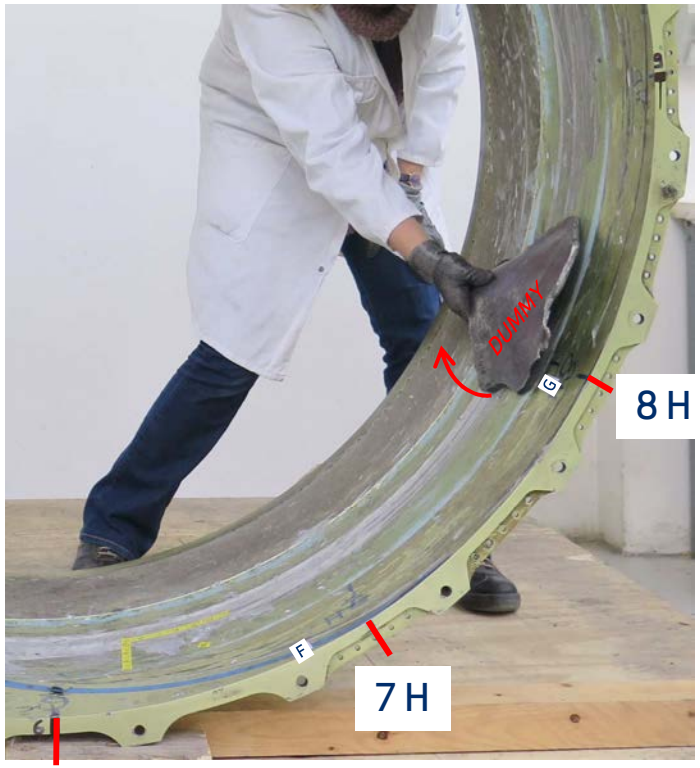


Preliminary data based on non validated assumption

CFM56-7 N°874112

SOUTHWEST

FLA view

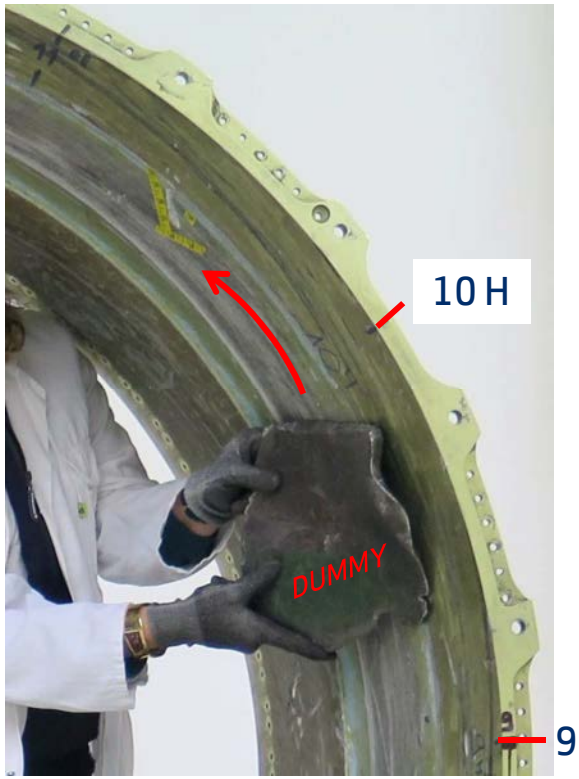


Preliminary data based on non validated assumption

CFM56-7 N°874112

SOUTHWEST

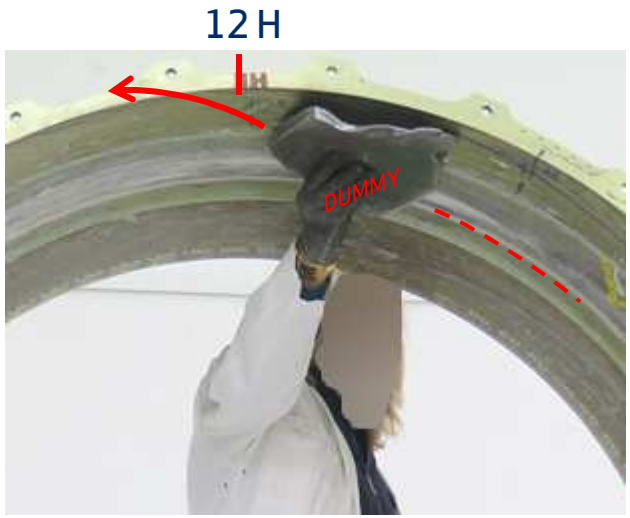
FLA view



Preliminary data based on non validated assumption

CFM56-7 N°874112

SOUTHWEST



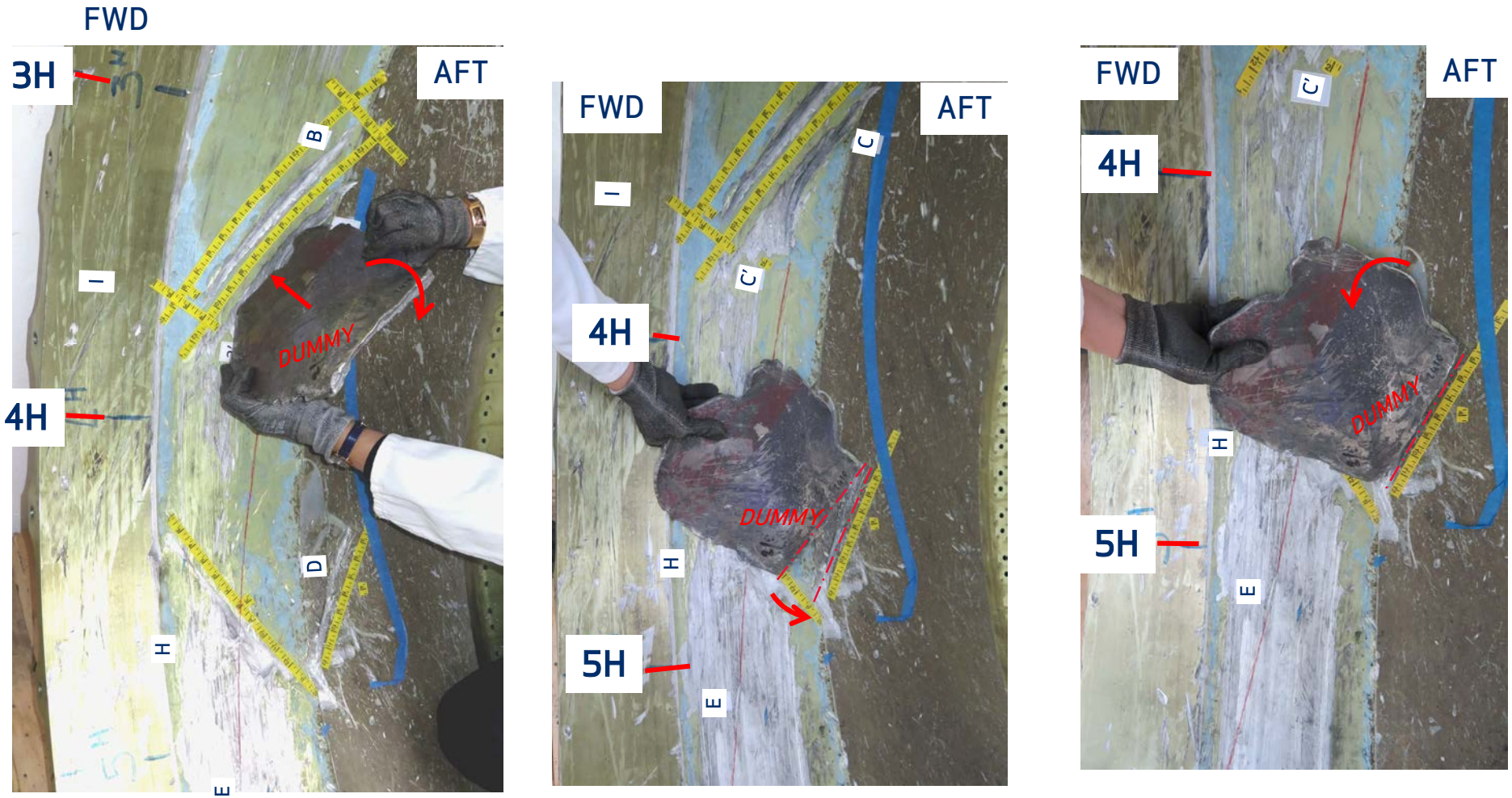
Root blade was exited at 12H

Preliminary data based on non validated assumption

CFM56-7 N°874112

SOUTHWEST

FAN BLADE # 23 ROOT TRAJECTORY



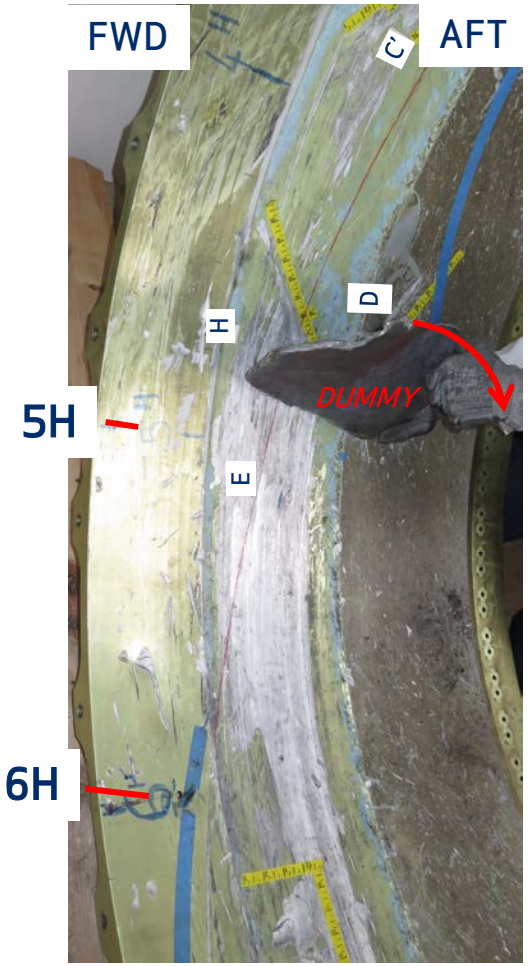
FAN case inner views

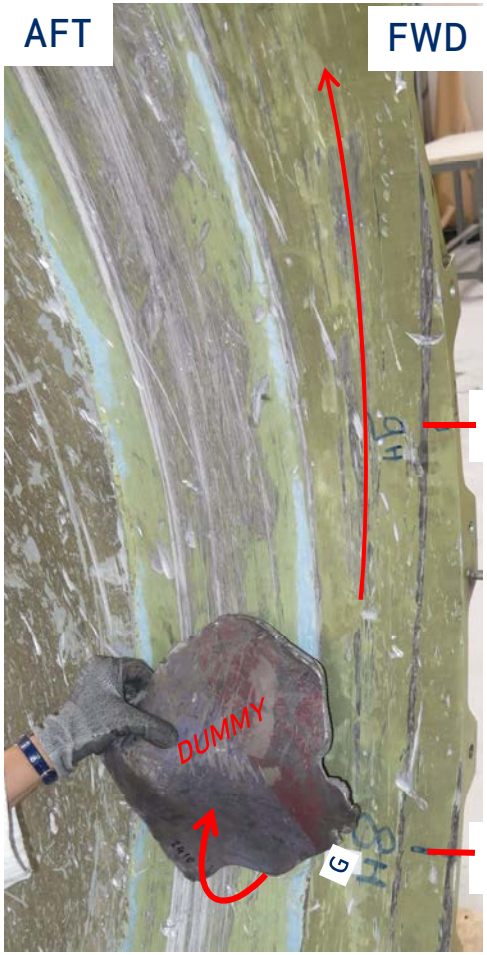
Preliminary data based on non validated assumption

CFM56-7 N°874112

SOUTHWEST

FAN BLADE # 23 ROOT TRAJECTORY





FAN case inner view

Preliminary data based on non validated assumption

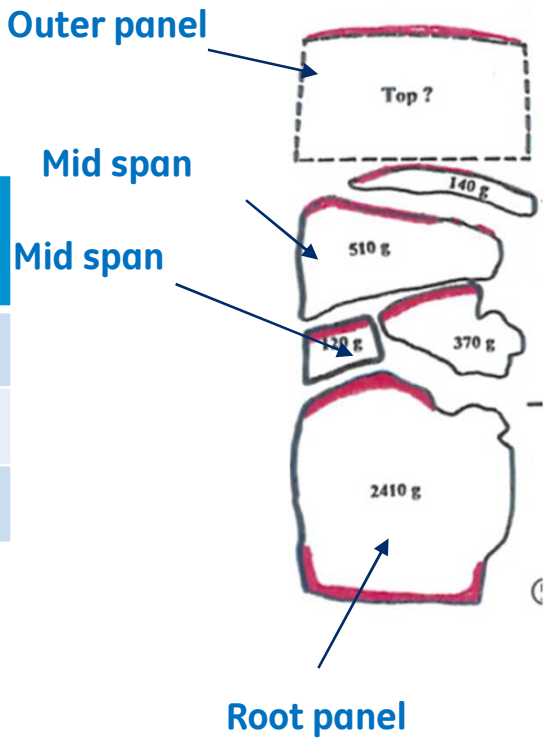
Back Up

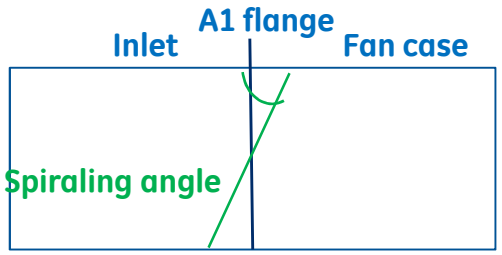
FBO – Released fragments energy estimation

Estimation of ESN874112 fragment angle

Measurement on fan casing from ESN874112

Fragment	Spiraling angle measurement on ESN874112 fan case
Outer Panel	-14°
Mid Span	-6°
Root Panel	-9°





Spiraling angle measured on fan case from ESN874112 are below data provided during certification process (15°)