

NATIONAL TRANSPORTATIONS SAFETY BOARD
Office of Aviation Safety
Central Region

Summary of Fabric Examination and Testing

-- CEN17FA231 --

A. ACCIDENT

Location: Hartford, WI
Date: June 15, 2017
Aircraft: Gefa Flug AS105 GD4, G-SUNA

B. PARTICIPANTS

Pamela Sullivan
Senior Air Safety Investigator
National Transportation Safety Board

Andrew Baird
General Manager and FAA DER
Cameron Balloons

C. ACCIDENT SUMMARY

On June 15, 2017, at 1115 central daylight time, a Gefa-Flug AS-105-GD thermal airship, United Kingdom registration G-SUNA, collided with the terrain in Hartford, Wisconsin, following an inflight envelope panel failure. The commercial pilot was seriously injured, and the thermal airship was destroyed. The airship was registered to and operated by AirSign LTD, as a 14 Code of Federal Regulations Part 91 business flight. Visual flight rules conditions existed near the accident site at the time of the accident, and a flight plan had not been filed. The local flight departed from the Erin Aero Airport (WN75) at 1100 and was returning to the airport when the accident occurred.

Summary of Accident Site and Aircraft Examinations

D. GENERAL DESCRIPTION

Envelope

The stitching around the seam tapes was examined and appeared to have been sew properly. The tests were performed on 12 pieces of the accident envelope and 12 pieces of new fabric for comparison purposes. The weft refers to the threads that run horizontally on the loom and get woven in front of and behind the warp. The warp is the tightly stretched lengthwise core of a fabric, while the weft is woven between the warp threads to create various patterns.

Test Performed (Arbitrary Letters for Identification)	Fabric Orientation Accident Envelope	Fabric Sample	Results
Grab	Warp	I	125 lbf
		K	130 lbf
		L	110 lbf
	Weft	E	110 lbf
		F	90 lbf
		G	88 – 90 lbf
	New Fabric:		
	Warp	2 Sample Average	200 lbf
	Weft	3 Sample Average	195 lbf

The grab test was used to test the tensile strength of the fabric. Tensile force was applied to the fabric until it ruptured. Minimum force should be 33 lbf in warp and 66 lbf in weft.

Tear	Warp	A	14 lbf Hover, Peak 16 lbf
		B	14 lbf Average Hover, no snap
		M	15 lbf Average Hover
	Weft	C	10 lbf Hover
		D	10 lbf Hover
		J	10 – 12 lbf Hover
New Fabric:			
Warp	3 Sample Average	49 lbf	
Weft	3 Sample Average	46 lbf	

The tongue tear test was used to measure the tear force and the tear strength of a fabric. The fabric sample was cut partway down the center forming two tongues which were placed in grips. Tensile force was applied until the torn along the mid-line between the tongues.