

DCA97MA017

ATTACHMENTS_I
(1 - 35)

NATIONAL TRANSPORTATION SAFETY BOARD
Office of Aviation Safety
490 L'Enfant Plaza, S.W.
Washington D.C. 20594-2000

January 24, 1997

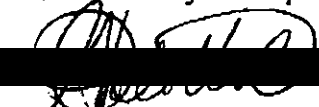
Weather Questions

Accident: EMB-120, N265CA, COMAIR Flight 3272, January 9, 1997, at about 2055Z, near Monroe, Michigan [about 210 degrees at 19 nautical miles from DTW].

Dear Captain LaViola:

In order to help us determine the environment COMAIR Flight 3272 was operating in prior to and up to the time of the accident please supply answers to the following applicable questions. Please mail the response to me at the above address or FAX the response to the following number: 202.314.6339. If you have any questions or comments please feel free to contact me at [redacted] .. e-mail [redacted]

Thank you for your help.


[redacted]
Gregory D. Salottolo
National Resource Specialist
Meteorology

ICING*****

LOCATION (ICING) *Most of the icing that occurred greater than light in nature was north of DTW on the Polar Arrival at 11-13K*
TIME OR TIME PERIOD *Approximately 1540-50 Z*
TYPE AIRCRAFT *De Havilland Dash-8-100*
FLIGHT NUMBER/TAIL NUMBER *MESABA 3176 N828MA*
ICE PROTECTION SYSTEMS INSTALLED *Standard Anti + Deice Systems*
TYPE SYSTEMS *pressurized boots - Prop heat + Intake doors + heat*

①

CLOUD BASES IMC Throughout Flight - Multiple Layers
 CLOUD TOPS During descent IN DTW. Tops ABOVE FL190
 well north of DTW.
 PRECIPITATION - mostly snow in clouds Light in intensity
 VISIBLE MOISTURE yes - mostly dry snow in clouds + Between Layers
 SIZE OF DROPS (DRIZZLE, RAIN, CLOUD, MIST) N/A Snow
 DROPS SPLATTERING ON WINDSHIELD " "
 ICE CRYSTALS/SNOW yes
 INTENSITY OF ICING During Icing conditions, north of DTW at 16K.
 11K feet. Occasional moderate ice - mostly Light mixed + Rime.
 HOW DETERMINED - windshield Post on wiper.
 RATE OF ICE ACCUMULATION (INCHES PER MINUTE) N/A
 HOW DETERMINED n/a
 TYPE OF ICE Light + occasional moderate mixed at 16K ~ 11K ft
 ICING AFT OF BOOTS/PROTECTED SURFACES none
 HOW FAR AFT n/a
 TOP AND/OR UNDERSIDE OF WING n/a
 SIDE WINDOW ICING none
 ICING ON PROP SPINNER - normal amount
 HOW FAR AFT ON PROP SPINNER 2 inches aft
 SHAPE OF ICE conformed to spinner
 AMOUNT OF ICE ON AIRFRAME less than 1/8"
 IAS IN ICING ENVIRONMENT - Between 210 + 190 KIAS
 TAS IN ICING ENVIRONMENT - slightly higher. Not really observed
 AT Time.

②

TIME IN ICING ENVIRONMENT *Approx. 10-15 minutes on arrival*
ICING IN CLOUDS OR CLEAR *Into DTW Airport.*
ICING ALTITUDE(S) *In Clouds*
Just icing occurred in descent from Naid of Fnt unit?
Below 11,000 feet on Polar Arrival into DTW
CLIMBING, DESCENDING, LEVEL FLIGHT - *Level + descent*
OUTSIDE AIR TEMPERATURE (ICING ENVIRONMENT) *-10°C SAT OR WARMER.*
TOTAL AIR TEMPERATURE *N/A*
TURBULENCE IN ICING ENVIRONMENT *Light associated with cloud layer*
in descent.
INFLIGHT VISIBILITY *0 IMC*
WINDS *Aloft were out of the S.W. on approach approach*
30-40 kt Tailwind AT 4000-5000.
HOW DETERMINED *On Board Computer.*
WIND SHEAR IN ICING ENVIRONMENT/ INTENSITY OF WIND SHEAR - *NOT*
detected. - Directional changes were minimal in Icing Environment
AWARE ICING FORECAST - *Yes. Don't recall precise forecast.*
INTENSITY OF ICING FORECAST - *Don't recall.*
HOW BECAME AWARE OF FORECAST - *on Board wx*
DID YOU PROVIDE PILOT REPORT - *negative*
CHARACTER OF CLOUDS- CUMULUS STRATUS *Layers*
ECHOES ON WEATHER RADAR - *none*
DESCRIBE ECHOES ON WEATHER RADAR - *none*
STORMSCOPE DISPLAY *N/A*
DESCRIBE STORMSCOPE DISPLAY *N/A*
CONTROL PROBLEMS - *none*
TIME LANDED / LOCATION *AT DTW*
ANY ICE OBSERVED ON AIRPLANE ON THE GROUND - *Just traces of*
what remained on A/c.

③



[Handwritten signature]

④

Please let me know -

If I can be of any further assistance -

Airspeed variations were not excessive \pm 5-9 knots
No ice was detected, light turbulence or "chop"

At 10-15k upon landing on 3R. On the approach
the winds shifted in the descent to easterly
The approach a bit more difficult than usual, however.
Approximately 220' at 30-40 knots. This made
the winds aloft at 4000-5000 feet were
icing was not more than a trace at times.
on the arrival. During approach sequencing
icing was only of concern at high altitudes
low more through this area at this time of year.
on this day was fairly consistent when a "wind up"
The only thing that I can add is that the w/r

ADDITIONAL COMMENTS

TYPE / LOCATION / AMOUNT OBSERVED ON GROUND Snow/BTW / 2-3" etc

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January 31, 1997

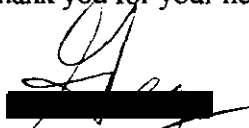
Weather Questions

Accident: EMB-120, N265CA, COMAIR Flight 3272, January 9, 1997, at about 2055Z, near Monroe, Michigan [about 210 degrees at 19 nautical miles from DTW].

Dear ^{how} Captain Zajicek:

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Thank you for your help.


Gregory D. Salottolo
National Resource Specialist
Meteorology

ICING*****

LOCATION (ICING)

Descent + approach to Detroit Int'l Apt.

TIME OR TIME PERIOD

~ 1600 EST, 1/8/97

TYPE AIRCRAFT

Airbus A320

FLIGHT NUMBER/TAIL NUMBER

Flt. 2050 / N641AW

ICE PROTECTION SYSTEMS INSTALLED

Eng cool Thermal Anti Icing (TAI), Wing TAI, Window + probes electrical anti-ice

TYPE SYSTEMS

all in use at the time.

Standard Airbus anti icing equipment.

⑤

TIME IN ICING ENVIRONMENT

~ 5-10 minutes.

ICING IN CLOUDS OR CLEAR

In clouds.

ICING ALTITUDE(S)

Ground level up to considerably higher. I don't recall cloud tops. I think

CLIMBING, DESCENDING, LEVEL FLIGHT: There were multiple layers + thick lowest layer (gnd to > 5000' AGL)
Descending.

OUTSIDE AIR TEMPERATURE (ICING ENVIRONMENT)

Can't recall exactly, but below +10°C TAT.

TOTAL AIR TEMPERATURE

Below +10°C.

TURBULENCE IN ICING ENVIRONMENT

Can't recall ^{exactly} but nothing worse than light, occasional moderate.

INFLIGHT VISIBILITY

Low in clouds (< 1 mile)

WINDS

Can't recall.

HOW DETERMINED

At the time I would use ATIS winds + wind vector (direction + speed) on my Nav. Display (IRS generate)

WIND SHEAR IN ICING ENVIRONMENT/ INTENSITY OF WIND SHEAR

No severe windshears.

AWARE ICING FORECAST

Yes

INTENSITY OF ICING FORECAST

Can't recall.

HOW BECAME AWARE OF FORECAST

America West weather reports, ATIS, + Tower reports.

DID YOU PROVIDE PILOT REPORT

No. Low vis approach, icy runway + taxiways + low visibility on the ground kept us busy until we were in the gate.

CHARACTER OF CLOUDS- CUMULUS/STRATUS

Stratus.

ECHOES ON WEATHER RADAR

Can't recall

DESCRIBE ECHOES ON WEATHER RADAR

~~NA~~ - can't recall

STORMSCOPE DISPLAY

N/A

DESCRIBE STORMSCOPE DISPLAY

N/A

CONTROL PROBLEMS

Nothing major.

TIME LANDED / LOCATION

Ft. 2050 - Landed Detroit Int'l ~ 1600 EST. Aircraft N641AW.

ANY ICE OBSERVED ON AIRPLANE ON THE GROUND

Can't recall.

6

Greg - The following answers are to the best of my memory on the day of the accident. Unfortunately, not being aware of the tragedy so close to me, I kept no paperwork + took no notes. If I can be of further assistance - please contact me

CLOUD BASES

Low. I think less than 500' (we didn't see the runway until near 3/4 m)

CLOUD TOPS

Can't recall.

PRECIPITATION

Can't recall.

VISIBLE MOISTURE

Definitely - we were in IMC for most of the approach (ILS 3R).

SIZE OF DROPS (DRIZZLE, RAIN, CLOUD, MIST)

Small I believe. Clouds, possibly freezing drizzle or snow.

DROPS SPLATTERING ON WINDSHIELD

No

ICE CRYSTALS/SNOW

Probably - can't recall exactly.

INTENSITY OF ICING

I would say moderate. It varied at different altitudes.

HOW DETERMINED

Watching ice accumulation on ice probe between pilots windshields.

RATE OF ICE ACCUMULATION (INCHES PER MINUTE)

Approx. 1/4 inch during 5-8 minute approach, varying during app at different times + at

HOW DETERMINED

By occasionally looking at ice probe + subjectively estimating rate + thickness.

TYPE OF ICE

Rime ice - white + frosty in appearance.

ICING AFT OF BOOTS/PROTECTED SURFACES

Don't recall seeing any.

HOW FAR AFT

N/A

TOP AND/OR UNDERSIDE OF WING

Don't recall seeing any.

SIDE WINDOW ICING

None

ICING ON PROP SPINNER

N/A

HOW FAR AFT ON PROP SPINNER

N/A

SHAPE OF ICE

Smooth.

AMOUNT OF ICE ON AIRFRAME

~ 1/4 inch on ice probe. This is indicative of ice on airframe where ice accumulates - i.e. leading edge of wing.

IAS IN ICING ENVIRONMENT

IAS on A-320 is determined by weight + configuration. I sometimes

TAS IN ICING ENVIRONMENT

add 5-10 Kts for adverse conditions (i.e. ice).

N/A. We use IAS.

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TYPE / LOCATION / AMOUNT OBSERVED ON GROUND

ADDITIONAL COMMENTS

The icing and low visibility, ^{during the approach} as well as the slippery, packed snow on the runway and taxiways stand out in my memory on 1/8/97. The traffic and radio traffic were moderate for a fairly large airport like KDTW.

The pilot workload level was pretty busy due to the icing, low visibility, concern for runway conditions, and the fair possibility of having to go missed approach - fuel, alternate, return for another try, etc.

Feel free to contact me if I can be of any further assistance.

Capt. Louis F. Zajicek Jr.

~~Capt. Louis F. Zajicek Jr.~~

P0520

2/7/97

My home tel. # is

My address is

Phoenix, AZ, 85045

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January 21, 1997

Weather Questions

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Thank you for your help.


[REDACTED]
Gregory D. Salottolo
National Resource Specialist
Meteorology

ICING*****

LOCATION (ICING)

TIME OR TIME PERIOD

TYPE AIRCRAFT B 727-200

FLIGHT NUMBER/TAIL NUMBER F14 # 243 ship # 2202 (? tail #)

ICE PROTECTION SYSTEMS INSTALLED eng. + wing anti-ice

TYPE SYSTEMS

CLOUD BASES low to ground; do not remember exactly

9

CLOUD TOPS can't remember, but guessing between 5,000' → 9,000' (?) blue sky above

PRECIPITATION } on ground, yes
VISIBLE MOISTURE } in flight, no precipitation, only cloud.

SIZE OF DROPS (DRIZZLE, RAIN, CLOUD, MIST) Cloud

DROPS SPLATTERING ON WINDSHIELD No

ICE CRYSTALS/SNOW No

INTENSITY OF ICING LGT - MOD

HOW DETERMINED viewing ice on bolts, washers of windshield wipers

RATE OF ICE ACCUMULATION (INCHES PER MINUTE) guessing we picked up approx. 1/2" in 15-20 min

HOW DETERMINED viewing windshield wipers

TYPE OF ICE rime

ICING AFT OF BOOTS/PROTECTED SURFACES

HOW FAR AFT ?

TOP AND/OR UNDERSIDE OF WING ?

SIDE WINDOW ICING no

ICING ON PROP SPINNER

HOW FAR AFT ON PROP SPINNER

SHAPE OF ICE

AMOUNT OF ICE ON AIRFRAME ?

IAS IN ICING ENVIRONMENT ≈ 250 kts

TAS IN ICING ENVIRONMENT can't remember, but TAT was less than +10°C

TIME IN ICING ENVIRONMENT do not know precisely, but guessing approx. 20 minutes

ICING IN CLOUDS OR CLEAR

icing in clouds

10

•

ICING ALTITUDE(S) started picking it up as we entered tops of overcast

CLIMBING, DESCENDING, LEVEL FLIGHT descending, level flight

OUTSIDE AIR TEMPERATURE (ICING ENVIRONMENT)

TOTAL AIR TEMPERATURE TAT was less than -70°C ; can't remember exactly

TURBULENCE IN ICING ENVIRONMENT not that I remember - smooth

INFLIGHT VISIBILITY in clouds

WINDS no wind aloft info.

HOW DETERMINED

WIND SHEAR IN ICING ENVIRONMENT/ INTENSITY OF WIND SHEAR no

AWARE ICING FORECAST aware of potential icing simply by observing outside temperature and knowing clouds were below us.

INTENSITY OF ICING FORECAST

HOW BECAME AWARE OF FORECAST

DID YOU PROVIDE PILOT REPORT I did not make a PIREP as I did not consider existing conditions a hazard; First

CHARACTER OF CLOUDS- CUMULUS/STRATUS STRATUS

ECHOES ON WEATHER RADAR WX RADAR not on

DESCRIBE ECHOES ON WEATHER RADAR

STORMSCOPE DISPLAY

DESCRIBE STORMSCOPE DISPLAY

CONTROL PROBLEMS

TIME LANDED / LOCATION landed at 2036z / DTW

ADDITIONAL COMMENTS

Since this was a routine, nothing out of the ordinary arrival, I was not focused on the details, the particulars of cloud tops,

OAT, speeds, etc. It was a typical winter time descent into DTW. We anticipated icing by putting eng + wing heat on prior to descending into stratus clouds below.

of course was making radar that day, and I think he made some reference that he was picking up some ice. This was not a PIREP. This was his very first trip as FO, and he made an off-the-cuff remark. As Captain, I did not think an icing PIREP was necessary as icing was expected and rate of accumulation was not a hazard for any plane certified for flight in icing conditions.



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Thank you for your help.


[redacted]
Gregory D. Salottolo
National Resource Specialist
Meteorology

ICING*****

LOCATION (ICING) DTW ARRIVAL

TIME OR TIME PERIOD 1545 L ±

TYPE AIRCRAFT A-320

FLIGHT NUMBER/TAIL NUMBER FLT 208

ICE PROTECTION SYSTEMS INSTALLED ENG & wings Heated

TYPE SYSTEMS

CLOUD BASES 400-500'

12

CLOUD TOPS 11,000
PRECIPITATION Light Snow
VISIBLE MOISTURE
SIZE OF DROPS (DRIZZLE, RAIN, CLOUD, MIST)
DROPS SPLATTERING ON WINDSHIELD NO
ICE CRYSTALS/SNOW YES
INTENSITY OF ICING Light Rime
HOW DETERMINED windshield Probe
RATE OF ICE ACCUMULATION (INCHES PER MINUTE) UNKNOWN
HOW DETERMINED 1/2" or less on Probe During Descent from 11,000
TYPE OF ICE Rime
ICING AFT OF BOOTS/PROTECTED SURFACES
HOW FAR AFT
TOP AND/OR UNDERSIDE OF WING
SIDE WINDOW ICING No
ICING ON PROP SPINNER
HOW FAR AFT ON PROP SPINNER
SHAPE OF ICE
AMOUNT OF ICE ON AIRFRAME 1/2" or less
IAS IN ICING ENVIRONMENT 250 or less
TAS IN ICING ENVIRONMENT
TIME IN ICING ENVIRONMENT APPROX 15'
ICING IN CLOUDS OR CLEAR CLOUDS

13

ICING ALTITUDE(S) 11,000 $\frac{1}{2}$ below
CLIMBING, DESCENDING, LEVEL FLIGHT Descending
OUTSIDE AIR TEMPERATURE (ICING ENVIRONMENT) ?
TOTAL AIR TEMPERATURE
TURBULENCE IN ICING ENVIRONMENT No
INFLIGHT VISIBILITY Poor
WINDS
HOW DETERMINED
WIND SHEAR IN ICING ENVIRONMENT/ INTENSITY OF WIND SHEAR No
AWARE ICING FORECAST
INTENSITY OF ICING FORECAST
HOW BECAME AWARE OF FORECAST
DID YOU PROVIDE PILOT REPORT No
CHARACTER OF CLOUDS- CUMULUS/STRATUS STRATUS
ECHOES ON WEATHER RADAR No
DESCRIBE ECHOES ON WEATHER RADAR
STORMSCOPE DISPLAY
DESCRIBE STORMSCOPE DISPLAY
CONTROL PROBLEMS No
TIME LANDED / LOCATION Detroit
ADDITIONAL COMMENTS

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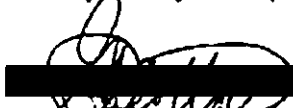
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Thank you for your help.


[redacted]
Gregory D. Salottolo
National Resource Specialist
Meteorology

ICING*****

LOCATION (ICING)

TIME OR TIME PERIOD

TYPE AIRCRAFT

FLIGHT NUMBER/TAIL NUMBER

ICE PROTECTION SYSTEMS INSTALLED

TYPE SYSTEMS

CLOUD BASES

15

CLOUD TOPS

@ 12000'

PRECIPITATION

None

VISIBLE MOISTURE

clouds-

SIZE OF DROPS (DRIZZLE, RAIN, CLOUD, MIST)

cloud.

DROPS SPLATTERING ON WINDSHIELD

No

ICE CRYSTALS/SNOW

No

INTENSITY OF ICING

Trace-Light

HOW DETERMINED

Rate of accumulation on Wipers

RATE OF ICE ACCUMULATION (INCHES PER MINUTE)

HOW DETERMINED

TYPE OF ICE

Trace Rime

ICING AFT OF BOOTS/PROTECTED SURFACES

No

HOW FAR AFT

TOP AND/OR UNDERSIDE OF WING

N/A

SIDE WINDOW ICING

No

ICING ON PROP SPINNER

N/A

HOW FAR AFT ON PROP SPINNER

N/A

SHAPE OF ICE

Rough

AMOUNT OF ICE ON AIRFRAME

TRACE

IAS IN ICING ENVIRONMENT

250 KTS

TAS IN ICING ENVIRONMENT

TIME IN ICING ENVIRONMENT

5-8 min.

ICING IN CLOUDS OR CLEAR

In clouds Btwn @ 12,000' - 8000'

(16)

ICING ALTITUDE(S)

8000' - 12000'

CLIMBING, DESCENDING, LEVEL FLIGHT

Level + Descending.

OUTSIDE AIR TEMPERATURE (ICING ENVIRONMENT)

TOTAL AIR TEMPERATURE

TURBULENCE IN ICING ENVIRONMENT

Smooth.

INFLIGHT VISIBILITY

WINDS

HOW DETERMINED

WIND SHEAR IN ICING ENVIRONMENT/ INTENSITY OF WIND SHEAR

No

AWARE ICING FORECAST

Yes, on DTW ATIS

INTENSITY OF ICING FORECAST

* Light - moderate

HOW BECAME AWARE OF FORECAST

DTW ATIS

DID YOU PROVIDE PILOT REPORT

Yes

CHARACTER OF CLOUDS - CUMULUS/STRATUS

Stratus

ECHOES ON WEATHER RADAR

No

DESCRIBE ECHOES ON WEATHER RADAR

N/A

STORMSCOPE DISPLAY

N/A

DESCRIBE STORMSCOPE DISPLAY

N/A

CONTROL PROBLEMS

None

TIME LANDED / LOCATION

2105 Z at DTW

ADDITIONAL COMMENTS

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Thank you for your help.


[redacted]
Gregory D. Salottolo
National Resource Specialist
Meteorology

ICING *Moderate to Severe*
LOCATION (ICING) *could only observe windshield (FRONT)*
TIME OR TIME PERIOD *2100Z*
TYPE AIRCRAFT *DC9-30*
FLIGHT NUMBER/TAIL NUMBER *9601-FGT NWA 272*
ICE PROTECTION SYSTEMS INSTALLED *Bleed Air from Jet Eng.*
TYPE SYSTEMS *HOT Wing - tail - windshield's*
CLOUD BASES *500' AGL*

CLOUD TOPS 4-5000'

PRECIPITATION Clear above clouds / Turning to Mod. Snow AT Ground level

VISIBLE MOISTURE Did NOT seem to be ANY until 2000' then snow

SIZE OF DROPS (DRIZZLE, RAIN, CLOUD, MIST)

DROPS SPLATTERING ON WINDSHIELD - ICE formed immediately upon entering clouds 4-5000'

ICE CRYSTALS/SNOW

INTENSITY OF ICING Mod - to severe - heaviest I've seen this season

HOW DETERMINED Amount forming on windshield wiper

RATE OF ICE ACCUMULATION (INCHES PER MINUTE) 1/2" per minute

HOW DETERMINED Visually watching

TYPE OF ICE Rime

ICING AFT OF BOOTS/PROTECTED SURFACES N/A (Able to observe)

HOW FAR AFT N/A

TOP AND/OR UNDERSIDE OF WING N/A

SIDE WINDOW ICING Some splash back does NOT happen to other windows - only N.Y. ice will do this

ICING ON PROP SPINNER N/A

HOW FAR AFT ON PROP SPINNER N/A

SHAPE OF ICE N/A

AMOUNT OF ICE ON AIRFRAME N/A

IAS IN ICING ENVIRONMENT 210 KTS

TAS IN ICING ENVIRONMENT 220 KTS

TIME IN ICING ENVIRONMENT 4 minutes - asked to climb back to clear when instructed to hold

ICING IN CLOUDS OR CLEAR Any in clouds

ICING ALTITUDE(S) *Approx 4-5000' down to 1800'agl*
CLIMBING, DESCENDING, LEVEL FLIGHT *LUL + descending*
OUTSIDE AIR TEMPERATURE (ICING ENVIRONMENT) *Approx 0° RAT Temp*
TOTAL AIR TEMPERATURE *✓*

TURBULENCE IN ICING ENVIRONMENT *NONE*

INFLIGHT VISIBILITY *0 zero in cloud*

WINDS *Approx 030 10-15*

HOW DETERMINED *ATIS AS much as I can remember*

WIND SHEAR IN ICING ENVIRONMENT/ INTENSITY OF WIND SHEAR *NONE*

AWARE ICING FORECAST *yes - from our Dispatch + ATIS*

INTENSITY OF ICING FORECAST *mod. to severe*

HOW BECAME AWARE OF FORECAST *Notice on Release from Dispatch*

DID YOU PROVIDE PILOT REPORT *Did NOT Experience any other than*

CHARACTER OF CLOUDS - CUMULUS/STRATUS *WHAT WAS forecast AND TOLD by ATC*
SOLID overcast

ECHOES ON WEATHER RADAR *NO*

DESCRIBE ECHOES ON WEATHER RADAR *NO*

STORMSCOPE DISPLAY *Very few if any returns*

DESCRIBE STORMSCOPE DISPLAY *NO*

CONTROL PROBLEMS *NO*

TIME LANDED / LOCATION *2120Z*

ADDITIONAL COMMENTS - *I would say the icing AT cloud entry (4-5000') until breaking out at 500'agl was extremely heavy to sure. based on operations I have flown, into DTW area and around Lake Erie in DC9 for 18 yrs with NWA. Capt. Wagne Sorenson DTW 111852 726. 810-437-0940*

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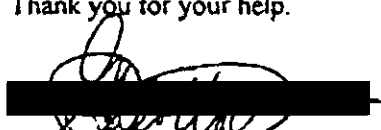
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Thank you for your help.


[REDACTED]
Gregory D. Salottolo
National Resource Specialist
Meteorology

ICING*****

LOCATION (ICING)

TIME OR TIME PERIOD

TYPE AIRCRAFT B757

FLIGHT NUMBER/TAIL NUMBER NWA 483 ship 550Z

ICE PROTECTION SYSTEMS INSTALLED -Eng + Wing

TYPE SYSTEMS

CLOUD BASES 700-800 A6L

21

CLOUD TOPS

PRECIPITATION - *Light Snow*

VISIBLE MOISTURE - *None except light snow*

SIZE OF DROPS (DRIZZLE, RAIN, CLOUD, MIST) - *small flakes*

DROPS SPLATTERING ON WINDSHIELD - *None*

ICE CRYSTALS/SNOW - *light*

INTENSITY OF ICING - *None observed*

HOW DETERMINED -

RATE OF ICE ACCUMULATION (INCHES PER MINUTE)

HOW DETERMINED

TYPE OF ICE

ICING AFT OF BOOTS/PROTECTED SURFACES

HOW FAR AFT

TOP AND/OR UNDERSIDE OF WING

SIDE WINDOW ICING

ICING ON PROP SPINNER

HOW FAR AFT ON PROP SPINNER

SHAPE OF ICE

AMOUNT OF ICE ON AIRFRAME

IAS IN ICING ENVIRONMENT - *210 KIAS - 130 KIAS*

TAS IN ICING ENVIRONMENT

TIME IN ICING ENVIRONMENT - *less than 5 minutes*

ICING IN CLOUDS OR CLEAR - *None*

ICING ALTITUDE(S)

CLIMBING, DESCENDING, LEVEL FLIGHT

OUTSIDE AIR TEMPERATURE (ICING ENVIRONMENT)

TOTAL AIR TEMPERATURE

TURBULENCE IN ICING ENVIRONMENT

INFLIGHT VISIBILITY *less than 1 mile*

WINDS - *Don't recall*

HOW DETERMINED

WIND SHEAR IN ICING ENVIRONMENT/ INTENSITY OF WIND SHEAR

AWARE ICING FORECAST

INTENSITY OF ICING FORECAST

HOW BECAME AWARE OF FORECAST

DID YOU PROVIDE PILOT REPORT - *No*

CHARACTER OF CLOUDS- CUMULUS/STRATUS

ECHOES ON WEATHER RADAR - *None*

DESCRIBE ECHOES ON WEATHER RADAR

STORMSCOPE DISPLAY

DESCRIBE STORMSCOPE DISPLAY

CONTROL PROBLEMS - *None*

TIME LANDED/ LOCATION - *Approximately 2045 Z*

ADDITIONAL COMMENTS - *Conditions looked like we should have expected icing problems, but none were actually observed.*

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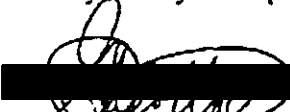
January 21, 1997

Weather Questions

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Thank you for your help.


[REDACTED]
Gregory D. Salottolo
National Resource Specialist
Meteorology

ICING*****

LOCATION (ICING) ON NEAR ARRIVAL INTO DTW
TIME OR TIME PERIOD AT 2040Z
TYPE AIRCRAFT B757
FLIGHT NUMBER/TAIL NUMBER NW 440 / 5509
ICE PROTECTION SYSTEMS INSTALLED WING & ENG ANTI-ICE
TYPE SYSTEMS WING & ENG ANTI-ICE
CLOUD BASES AT 3000'

24

CLOUD TOPS 20 FL 250
 PRECIPITATION SNOWING
 VISIBLE MOISTURE SNOW
 SIZE OF DROPS (DRIZZLE, RAIN, CLOUD, MIST)
 DROPS SPLATTERING ON WINDSHIELD
 ICE CRYSTALS/SNOW RIME ICING / SNOW
 INTENSITY OF ICING MODERATE
 HOW DETERMINED WINDSCREEN (FRONT)
 RATE OF ICE ACCUMULATION (INCHES PER MINUTE)
 HOW DETERMINED
 TYPE OF ICE RIME
 ICING AFT OF BOOTS/PROTECTED SURFACES
 HOW FAR AFT
 TOP AND/OR UNDERSIDE OF WING
 SIDE WINDOW ICING NONE
 ICING ON PROP SPINNER
 HOW FAR AFT ON PROP SPINNER
 SHAPE OF ICE
 AMOUNT OF ICE ON AIRFRAME
 IAS IN ICING ENVIRONMENT 295 - 250 KTS
 TAS IN ICING ENVIRONMENT
 TIME IN ICING ENVIRONMENT 20 MINUTES
 ICING IN CLOUDS OR CLEAR IN CLOUDS

25

ICING ALTITUDE(S)

CLIMBING, DESCENDING, LEVEL FLIGHT

DESCENDING

OUTSIDE AIR TEMPERATURE (ICING ENVIRONMENT)

~ -10°e

TOTAL AIR TEMPERATURE

TURBULENCE IN ICING ENVIRONMENT

NONE

INFLIGHT VISIBILITY

1/2 MI

WINDS

HOW DETERMINED

WIND SHEAR IN ICING ENVIRONMENT/ INTENSITY OF WIND SHEAR

AWARE ICING FORECAST

INTENSITY OF ICING FORECAST

HOW BECAME AWARE OF FORECAST

I HEARD OTHER PILOTS

OVER THE RADIO
DID YOU PROVIDE PILOT REPORT

NO

CHARACTER OF CLOUDS- CUMULUS/STRATUS

STRATUS (SOLID DECK FROM FL 250 - 300)

ECHOES ON WEATHER RADAR

NONE

DESCRIBE ECHOES ON WEATHER RADAR

STORMSCOPE DISPLAY

DESCRIBE STORMSCOPE DISPLAY

CONTROL PROBLEMS

NONE

TIME LANDED / LOCATION

~ 2050Z / DTW

ADDITIONAL COMMENTS

26

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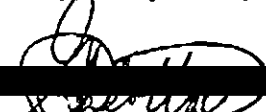
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Thank you for your help.


[REDACTED]
Gregory D. Salottolo
National Resource Specialist
Meteorology

ICING*****

LOCATION (ICING) Detroit Metro Airport
TIME OR TIME PERIOD 9 Jan '97 about 20:45Z
TYPE AIRCRAFT DC-10-40
FLIGHT NUMBER/TAIL NUMBER ^{NWA} Flight 68 ship 1143
ICE PROTECTION SYSTEMS INSTALLED Engine + Wing Anti-Ice.
TYPE SYSTEMS Bleed air
CLOUD BASES Near ground, 200'-400' ~~AGL~~ A.G.L.

CLOUD TOPS Intermediate - about 7,000' - 8,000'
PRECIPITATION SNOW
VISIBLE MOISTURE vis. $\frac{3}{4}$ mi in SNOW
SIZE OF DROPS (DRIZZLE, RAIN, CLOUD, MIST) NA
DROPS SPLATTERING ON WINDSHIELD NA
ICE CRYSTALS/SNOW
INTENSITY OF ICING No significant icing noted
HOW DETERMINED NA
RATE OF ICE ACCUMULATION (INCHES PER MINUTE) NA
HOW DETERMINED NA
TYPE OF ICE NA
ICING AFT OF BOOTS/PROTECTED SURFACES NA
HOW FAR AFT NA
TOP AND/OR UNDERSIDE OF WING NA
SIDE WINDOW ICING None
ICING ON PROP SPINNER NA
HOW FAR AFT ON PROP SPINNER NA
SHAPE OF ICE NA
AMOUNT OF ICE ON AIRFRAME None noted
IAS IN ICING ENVIRONMENT 210 kt \rightarrow 150 kt
TAS IN ICING ENVIRONMENT
TIME IN ICING ENVIRONMENT 15 mi
ICING IN CLOUDS OR CLEAR

ICING ALTITUDE(S) *Below 7000'*

CLIMBING, DESCENDING, LEVEL FLIGHT *Descending*

OUTSIDE AIR TEMPERATURE (ICING ENVIRONMENT) *Don't recall*

TOTAL AIR TEMPERATURE *?*

TURBULENCE IN ICING ENVIRONMENT *No significant turb.*

INFLIGHT VISIBILITY *0 until near*

WINDS *N.E. 12 kts ±*

HOW DETERMINED *ATIS & IWS*

WIND SHEAR IN ICING ENVIRONMENT/ INTENSITY OF WIND SHEAR *None Noted*

AWARE ICING FORECAST *yes*

INTENSITY OF ICING FORECAST *Moderate (I think)*

HOW BECAME AWARE OF FORECAST *Approach Control*

DID YOU PROVIDE PILOT REPORT *No*

CHARACTER OF CLOUDS- CUMULUS/STRATUS *stratus*

ECHOES ON WEATHER RADAR *No significant returns*

DESCRIBE ECHOES ON WEATHER RADAR

STORMSCOPE DISPLAY *NA*

DESCRIBE STORMSCOPE DISPLAY *NA*

CONTROL PROBLEMS *No!*

TIME LANDED/LOCATION *at gate 21:00Z; approx 20:50Z touchdown.*

ADDITIONAL COMMENTS

NATIONAL TRANSPORTATION SAFETY BOARD
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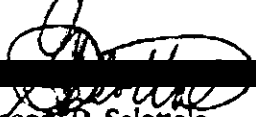
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Thank you for your help.


[redacted]
Gregory D. Salottolo
National Resource Specialist
Meteorology

ICING*****

LOCATION (ICING) Cetus II ARRIVAL
TIME OR TIME PERIOD 2030- LANDING
TYPE AIRCRAFT DC-10
FLIGHT NUMBER/TAIL NUMBER # 9451 / 1149
ICE PROTECTION SYSTEMS INSTALLED wing / ENGINE / ANI.
TYPE SYSTEMS Engine bleed / WINDSHIELD HEAT ETC.
CLOUD BASES 200ft

30

CLOUD TOPS ✓ N K 4000
PRECIPITATION sleet DEPENDS ON ALTITUDE
VISIBLE MOISTURE ✓ YES
SIZE OF DROPS (DRIZZLE, RAIN, CLOUD, MIST) Cloud
DROPS SPLATTERING ON WINDSHIELD NO
ICE CRYSTALS/SNOW YES
INTENSITY OF ICING moderate +
HOW DETERMINED windshield Iced over ABOVE 10,000 FT
DESCENDING
RATE OF ICE ACCUMULATION (INCHES PER MINUTE) ? MAYBE 1/2
HOW DETERMINED Looking AT WIPERS
TYPE OF ICE Rime
ICING AFT OF BOOTS/PROTECTED SURFACES ?
HOW FAR AFT ?
TOP AND/OR UNDERSIDE OF WING ?
SIDE WINDOW ICING NO
ICING ON PROP SPINNER —
HOW FAR AFT ON PROP SPINNER —
SHAPE OF ICE —
AMOUNT OF ICE ON AIRFRAME MGT.
IAS IN ICING ENVIRONMENT 330-160
TAS IN ICING ENVIRONMENT 330-160
TIME IN ICING ENVIRONMENT APPROX 20-30 MIN
ICING IN CLOUDS OR CLEAR IN CLOUDS

ICING ALTITUDE(S) 24000 TO GROUND APPROX
 CLIMBING, DESCENDING, LEVEL FLIGHT Descending
 OUTSIDE AIR TEMPERATURE (ICING ENVIRONMENT) ?
 TOTAL AIR TEMPERATURE ? Below 8° TAT
 TURBULENCE IN ICING ENVIRONMENT LIGHT
 INFLIGHT VISIBILITY IMC.
 WINDS ? DID NOT NOTICE VERY BUSY APPROACH.
 HOW DETERMINED IXS RVR 6000-3000
 2000 FT. CEIL.
 WIND SHEAR IN ICING ENVIRONMENT/INTENSITY OF WIND SHEAR POOR BLAKE NONE
 AWARE ICING FORECAST YES TP WITH SEVERE ICE WARR
 INTENSITY OF ICING FORECAST 'FRIDR CLR. MUST UNUSUAL)
 ? SEVERE
 HOW BECAME AWARE OF FORECAST TP - ACTS
 DID YOU PROVIDE PILOT REPORT Reported RUNWAY VERY VERY
 POOR BRAKING. MISSED TURN OFF
 CHARACTER OF CLOUDS - CUMULUS/STRATUS
 ECHOES ON WEATHER RADAR PRECIP - SNOW MODERATE
 DESCRIBE ECHOES ON WEATHER RADAR SEE ABOVE
 STORMSCOPE DISPLAY -
 DESCRIBE STORMSCOPE DISPLAY -
 CONTROL PROBLEMS NONE
 TIME LANDED / LOCATION BLOCK IN 2102 LANDED
 APPROX APPROX 2050
 ADDITIONAL COMMENTS
 VERY HEAVY ICE ABOVE 10,000 ON APPROACH
 BOTH WINGSPANS ~~WHICH~~ ICED OVER WITH MAX HEAT

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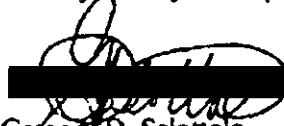
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Thank you for your help.


[REDACTED]
Gregory D. Salottolo
National Resource Specialist
Meteorology

ICING*****

LOCATION (ICING) DOWNWIND RWYS 21 DTW
TIME OR TIME PERIOD 2050-2100Z
TYPE AIRCRAFT A320
FLIGHT NUMBER/TAIL NUMBER ?
ICE PROTECTION SYSTEMS INSTALLED WINGS, ~~W~~ ENGINE
TYPE SYSTEMS BLEED AIR
CLOUD BASES RAGGED. APPROX 4000' MSZ

33

CLOUD TOPS *LAYERS TO 20,000 MSL*
PRECIPITATION *None*
VISIBLE MOISTURE *CLOUDS*
SIZE OF DROPS (DRIZZLE, RAIN, CLOUD, MIST) *CLOUDS*
DROPS SPLATTERING ON WINDSHIELD *None*
ICE CRYSTALS/SNOW
INTENSITY OF ICING *LT TO MODERATE RIME*
HOW DETERMINED *VISUAL*
RATE OF ICE ACCUMULATION (INCHES PER MINUTE) *?*
HOW DETERMINED
TYPE OF ICE *RIME*
ICING AFT OF BOOTS/PROTECTED SURFACES *N/A*
HOW FAR AFT *N/A*
TOP AND/OR UNDERSIDE OF WING *N/A*
SIDE WINDOW ICING *None.*
ICING ON PROP SPINNER *N/A*
HOW FAR AFT ON PROP SPINNER *N/A*
SHAPE OF ICE *N/A*
AMOUNT OF ICE ON AIRFRAME *None*
IAS IN ICING ENVIRONMENT *250-170*
TAS IN ICING ENVIRONMENT *?*
TIME IN ICING ENVIRONMENT *15 MIN*
ICING IN CLOUDS OR CLEAR *CLOUDS*

ICING ALTITUDE(S) 10,000 ↓ 4000 ?

CLIMBING, DESCENDING, LEVEL FLIGHT

OUTSIDE AIR TEMPERATURE (ICING ENVIRONMENT) ?

TOTAL AIR TEMPERATURE ?

TURBULENCE IN ICING ENVIRONMENT LIGHT OCNL

INFLIGHT VISIBILITY IN, OUT OF CLOUDS

WINDS ?

HOW DETERMINED N/A

WIND SHEAR IN ICING ENVIRONMENT/ INTENSITY OF WIND SHEAR NONE

AWARE ICING FORECAST NOT TO MY RECOLLECTION -

INTENSITY OF ICING FORECAST THESE WERE VERY TYPICAL CONDITIONS FOR TIME OF YEAR.

HOW BECAME AWARE OF FORECAST AHEAD EXPECTED.

DID YOU PROVIDE PILOT REPORT NO. ATC INVOLVED W/327Z

CHARACTER OF CLOUDS- CUMULUS/STRATUS CU/STRATUS

ECHOES ON WEATHER RADAR ?

DESCRIBE ECHOES ON WEATHER RADAR

STORMSCOPE DISPLAY N/A

DESCRIBE STORMSCOPE DISPLAY N/A

CONTROL PROBLEMS NO

TIME LANDED / LOCATION ?

ADDITIONAL COMMENTS
