



AIRCRAFT ACCIDENT REPORT

SAHCO-MAL/2021/11/21/F

Nigerian Safety Investigation Bureau

Final Report on the Incident involving a ground collision between a Lavatory Service Truck with fleet number 9/5 operated by Skyway Aviation Handling Company Plc (SAHCO) and a parked Boeing 737-300 aircraft with nationality and registration marks 5N-DAB operated by Max Air Limited which occurred at Nnamdi Azikiwe International Airport Abuja on 21 November 2021.

This report was produced by the Nigerian Safety Investigation Bureau (NSIB), Nnamdi Azikiwe International Airport, Abuja.

The report is based upon the investigation carried out by the Nigerian Safety Investigation Bureau under Annex 13 to the Convention on International Civil Aviation, Nigerian Safety Investigation Bureau (Establishment) Act, 2022, and Civil Aviation (Investigation of Air Accidents and Incidents) Regulations 2023.

Under Annex 13 to the Convention on International Civil Aviation, it is not the purpose of aircraft accident/serious incident investigations to apportion blame or liability.

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Recommendations in this report are addressed to the relevant stakeholders and Regulatory Authority of the State (NCAA). It is for this authority to ensure enforcement.

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GLOSSARY OF ABBREVIATIONS USED IN THIS REPORT

CAT.C	Category C
CSN	Cycles Since New
DNAA	Nnamdi Azikiwe International Airport Abuja
GSE	Ground Support Equipment
IATA	International Air Transport Association
IGOM	Ground Operations Manual
NSIB	Nigerian Safety Investigation Bureau
SAHCO	Skyway Aviation Handling Co. PLC
SOP	Standard Operating Procedure

Registered owner and operator:	SAHCO PLC
Vehicle type and model:	Mallaghan Atego
Manufacturer:	Mercedes Benz, Germany
Year of manufacture:	2013
Registration marks:	9/5
Chassis number:	WDB970012L777472
Location:	Stand D8 Nnamdi Azikiwe International Airport Abuja (DNAA)
Date and time:	21 November, 12:25 h

*All times in this report are local time
(UTC +1) unless otherwise stated*

SYNOPSIS

Nigerian Safety Investigation Bureau (NSIB) Nigeria was notified of the incident by an eyewitness on 21 November 2021 at about 15:35 h. Investigators were dispatched and arrived at the scene. Post-incident assessment commenced immediately under the provisions of the Civil Aviation (Investigation of Air Accidents and Incidents) Regulations 2019 and ICAO Annex 13.

5N-DAB was scheduled to operate eight sectors on the day. After the third sector, 5N-DAB was parked at Stand D8. While boarding passengers for the fourth sector (Abuja to Maiduguri), the Pilot requested Ground Service for the aircraft Lavatory.

According to the Ground Support Equipment (GSE) driver, he was attending to another aircraft when he was called upon to service the Max Air aircraft. After positioning the truck with the aid of a SAHCO GSE marshaller; it was put on chocks. When the driver realised his hands could not reach the aircraft Lavatory Drain Valve, he requested the

GSE marshaller to guide him to reposition the truck closer to the aircraft. The GSE driver further stated that to move the truck by reversing, he stepped on the Throttle Pedal instead of the Brake Pedal, and the truck impacted the aircraft's Tail section.

Causal factor

Abrupt stepping on the Throttle Pedal instead of the Brake Pedal, causing the truck to impact the parked aircraft's tail section.

Contributory factors

1. Less than adequate ramp supervision/coordination of SAHCO's GSE operations.
2. Inadequate workforce in the operation of SAHCO's ramp activities in handling more than one aircraft simultaneously.
3. Non-compliance with various sections of SAHCO's Operational and Ground Operation Manuals.
4. Lack of standard procedure for changing duties from one unfinished task to another.
5. The GSE Truck was not accurately marshalled the first time while positioning to service Max Air aircraft.
6. The GSE Truck did not wait to be marshalled after requesting to reposition.

Three Safety recommendations were made.

1.0 FACTUAL INFORMATION

1.1 History of the flight

On 21 November, 2021 at about 12:25 h, a lavatory service truck with fleet number 9/5 operated by Skyway Aviation Handling Co. PLC (SAHCO), had a ground collision with a parked Boeing 737-300 aircraft with nationality and registration marks 5N-DAB, operated by Max Air Limited, at Nnamdi Azikiwe International Airport, Abuja (DNAA).

5N-DAB was scheduled to operate eight sectors for the day. After the third sector, 5N-DAB was parked at stand D8. While boarding passengers for the fourth sector (Abuja to Maiduguri), the Pilot requested Ground Service for the aircraft Lavatory.

According to the Ground Support Equipment (GSE) driver, he was providing conveyor belt service to another aircraft when he was called upon to service the Max Air aircraft. After positioning the truck with the aid of SAHCO GSE marshaller, it was put on chocks. When the driver realised his hands could not reach the aircraft Lavatory Drain Valve, he requested the GSE marshaller to guide him to reposition the truck closer to the aircraft. The GSE driver further stated that to move the truck by reversing, he stepped on the Throttle Pedal instead of the Brake Pedal, and the truck impacted the aircraft's tail section. According to the GSE marshaller, as he removed the chock placed behind the tyre of the Lavatory Service Truck, the GSE driver abruptly reversed the lavatory service truck without waiting for Marshaller's clearance or communication. The lavatory service truck impacted the aircraft's tail section, continued to move underneath the aircraft and finally stopped after impacting a Catering Service Truck servicing the same aircraft on the left side.

The GSE marshaller further stated that after the Lavatory Service Truck impacted the Catering Service Truck, he rushed and opened the driver-side door to find out what went wrong. The driver fell out of the lavatory service truck on opening the door.

According to the Pilot, while preparing for the next sector (Abuja to Maiduguri), he heard a loud bang accompanied by the vibration of the aircraft. Boarding was stopped, and passengers who were already onboard were disembarked to await further instructions.

The incident occurred at about 12:25 h.

1.2 Injuries to persons

Not applicable

1.3 Damage to aircraft

The aircraft was substantially damaged.

1.4 Other damage

The lavatory service truck was substantially damaged.

1.5 Personnel information

1.5.1 Ground Support Equipment (GSE) Driver

Nationality:	Nigerian
Age:	33 years
License type:	National Driver's License (Class B), FAAN's Airside Drivers Permit
National driver's license:	Valid till 25th February 2022
Airside driver's permit:	Valid till July 31st, 2022

The GSE driver has a diploma in electrical electronics and basic GSE operator training and is qualified as a GSE (CAT.C) operator.

Information obtained from the SAHCO duty roster showed that the GSE Drivers operated a 4-shift roster with two days off duty. On the day of occurrence, he was on the morning shift (07:00 h -14:00 h). The driver reported on duty on the day of the occurrence at 07:00 h, and the incident occurred at 12:25 h.

1.6 Aircraft information

1.6.1 General information

Aircraft type:	B737-300
Manufacturer:	Boeing Aircraft Company, USA
Date of manufacture:	1999
Serial number:	30335
Registered owner/operator:	Max Air Limited
Nationality and registration marks:	5N-DAB
Certificate of airworthiness:	Valid till 3rd March 2022
Certificate of insurance:	Valid till 20th December 2021
Certificate of registration:	Issued 19th November 2020
Airframe time:	52,892:26 h
Cycles Since New (CSN):	39,095

1.6.2 Lavatory service truck information

Vehicle type:	Mallaghan Atego Truck
Manufacturer:	Mercedes Benz, Germany
Date of manufacture:	2013
Chassis number:	WDB970012L777472
Registered owner/operator:	SAHCO PLC
Registration number:	9/5

The truck was maintained under the manufacturer's recommendations. By design, the truck can move slowly on its own when it's in the front or backward mode without stepping on the Throttle pedal.

1.7 Meteorological information

Not applicable

1.8 Aids to navigation

Not applicable

1.9 Communications

There was no communication between the GSE Operator and the Marshaller

1.10 Aerodrome information

Not applicable

1.11 Flight recorders

Not applicable

1.12 Wreckage and impact information

5N-DAB was boarding passengers for the fourth sector of the day (Abuja-Maiduguri) at stand D8 of Nnamdi Azikiwe International Airport Abuja. The Lavatory Service Truck was positioned facing away from the 5N-DAB, to provide the requested service.

As the GSE driver attempted to reposition the Lavatory Service Truck, it moved (in reverse), passed underneath the rear bulkhead section of 5N-DAB, and continued moving until it eventually hit and was stopped by the Skycare Catering Services Truck on the left side of the Aircraft. The 5N-DAB, lavatory, and catering service trucks suffered various damage.

Before the arrival of NSIB investigators, the truck was moved from the scene of the occurrence and evidence was tampered with.

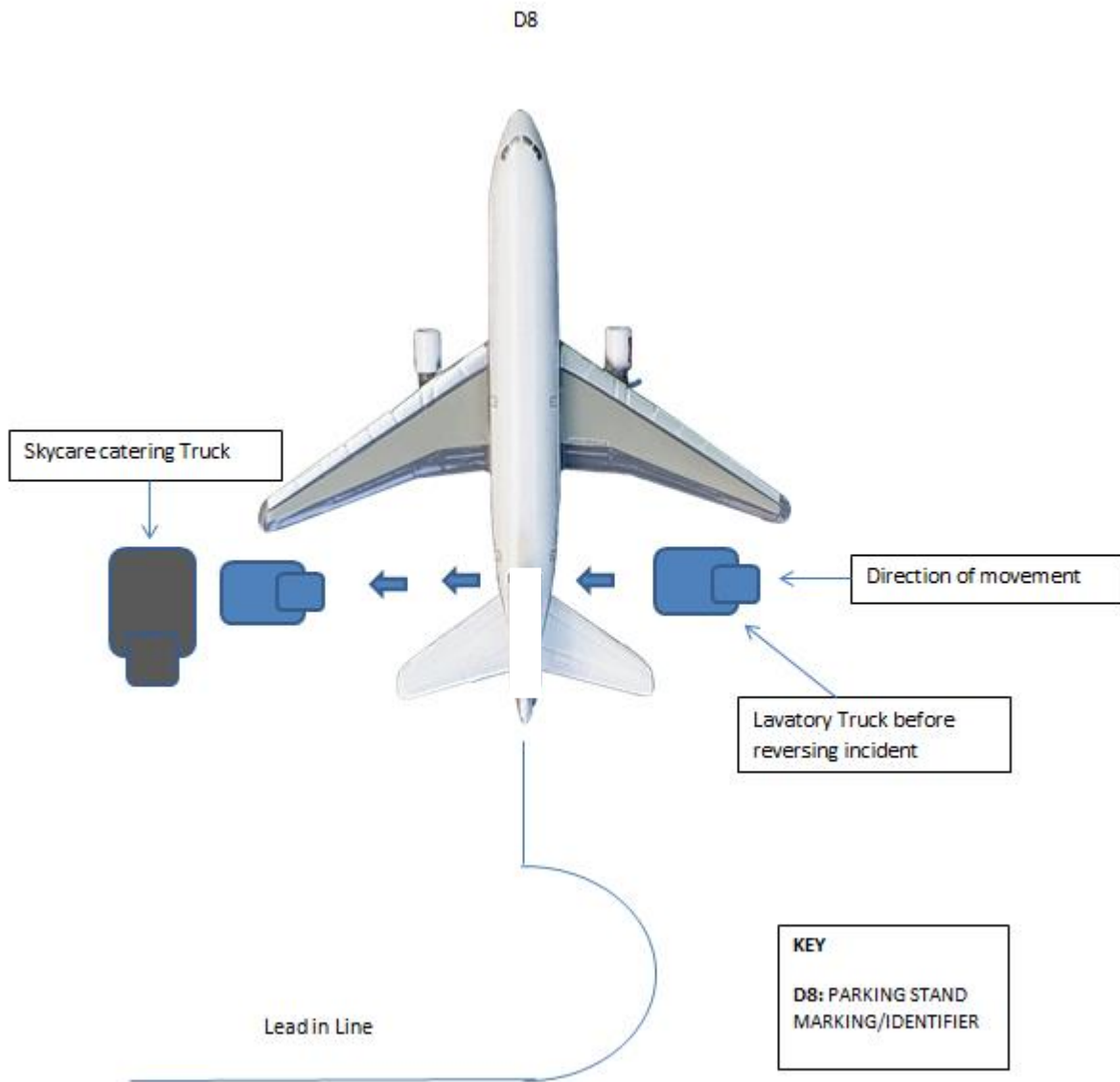


Figure 1: Sketch of the impact sequence.

The following damage was observed on the aircraft.

1. Three holes on the Aft section of the fuselage unpressurised area
2. Dents on the pressure bulkhead area

3. Broken rear outflow valve.
4. Broken lavatory service truck door
5. Broken drain valve handle and a damaged rear galley drain mast.



Figure 2: The aircraft and lavatory service truck after the occurrence.



Figure 3: Dent around the rear pressure bulkhead area.



Figure 4: Damaged rear galley drains mast.

5N-DAB



Figure 5: Three holes on the aft of the fuselage unpressurised area.



Figure 6: Broken outflow valve.

The following damage was observed on the trucks:

1. The SAHCO lavatory service truck head was substantially damaged.
2. The Skycare Catering Service truck was slightly damaged.



Figure 7: Damaged lavatory service truck after the incident.



Figure 8: Dent on the catering service truck.

1.13 Medical and pathological information

After the incident, the GSE driver was taken to the hospital for a check-up and multi-drug screening.

The results of the multi-drug screening test were negative.

1.14 Fire

There was no fire.

1.15 Survival aspect

The incident was survivable as the impact speed and contact between the lavatory service truck and the aircraft were minimal.

1.17 Organization and management information

1.17.1 Skyway Aviation Handling Company (SAHCO) PLC

The Skyway Aviation Handling Company PLC (SAHCO) is a Public Liability Company incorporated as an Aviation Ground Handling Services Provider under the Nigerian Companies and Allied Matters Act of 1990.

The duties of SAHCO involve all the actions from when the aircraft touches down on the tarmac to when it is airborne, ensuring that Ground Handling assignment is carried out efficiently and safely while deploying the right tools.

1.17.2 Excerpts from SAHCO PLC Standard Operating Procedures

Chapter 03 - Operational Safety

3.3.4

...

b. Marshalling The equipment to/from the aircraft by one guide person using standard hand signals is mandatory.

c. Guide from a position where accurate judgements can be made, and visual signals could be communicated to the operator to stop GSE if visual contact with the guide person is lost.

d. Ensure that no GSE/Vehicle should approach the aircraft in reverse without marshalling.

e. For high loaders, retract the side guide rail extension if extended, then lower the whole quad rail and place it flat on the central platform.

f. Switch off the unattended GSE near an aircraft with a neutral transmission and apply hand brake/parking brake. Keeping such vehicles away from operational areas unless required is advisable to ensure safety.

3.5.2

Conveyor Belt

****** When a conveyor belt is used, the equipment operator should always be available there.*

When the conveyor belt is not in use, stop the engine, pull the vehicle away from the aircraft and apply the parking /emergency brake ON.

1.17.3 Excerpts from SAHCO GROUND OPERATIONS MANUAL

7.1.3.5

b) Do not drive GSE faster than walking speed and Manoeuvre GSE carefully to prevent personnel injury and aircraft damage.

c) When reversing vehicles or equipment with limited rear-view visibility inside the Equipment Restraint Area, make sure you are:

- 1. guided by an agent using standard IATA signals and*
- 2. assisted using a rear-view video or mirror.*

e) when positioned at or near the aircraft, Unattended vehicles or motorised GSE have parking brakes set with a gear selector in park or neutral and wheel chocks set.

f) Do not drive or park under the aircraft fuselage and wing.

7.1.3.6

c) Make sure the guide person can accurately judge clearances and communicate signals to the driver/operator.

d) Stop immediately if visual contact with the guide person is lost

7.4.2

d) Keep in constant visual contact with the other ground staff and flight crew Throughout the manoeuvre, the operation must stop if visual contact is lost. And not re-commence until visual contact is re-established.

2.0 ANALYSIS

2.1 General

The Ground Support Equipment (GSE) driver was licensed, trained and qualified to perform his responsibilities. The truck was maintained under the manufacturer's recommendations. After the incident, toxicology tests were carried out on the GSE driver, and the results were negative. The analysis focuses on operational safety, ramp coordination and company policy adherence.

2.2 Operational safety and Ramp coordination

Ground Handling activities are safety-sensitive in the aviation industry. Ramp safety rules and procedures promote safe Ground Handling; hence, it is expected that the minimum safety rules, as documented and laid out, should be understood and followed accordingly by the Ground Handling operators and supervisors.

According to the Ground Support Equipment (GSE) driver, while providing conveyor belt service to another aircraft, was instructed to stop work and to proceed to service the lavatory of 5N-DAB.

Distraction, time pressure and fatigue may increase the likelihood of reacting inappropriately to the sudden change from one unfinished task to another.

The effect of duty time and the likelihood of fatigue could not be established, as information obtained from the SAHCO duty roster showed that the GSE Driver operated a four-shift daily roster with two days off duty in a week. On the day of occurrence, he was on the morning shift (07:00 h -14:00 h). The driver reported to duty on the day of occurrence at 07:00 h, and the incident occurred at 12:30 h.

The investigation believes that the GSE driver may have been in a hurry to finish the new task assigned and return to the unfinished task as there was no evidence of another personnel taking over the unfinished task. Consequently, while the GSE driver tried repositioning the lavatory service truck, the Reverse mode was selected. Instead of

depressing the Brake Pedal to slowly control the truck, the Driver mistakenly stepped on the Throttle Pedal, causing the lavatory service truck to impact the underbelly of 5N-DAB, continued rolling and then hit a Catering Service truck that was parked on the left side of the Aircraft.

Note: By design, the truck can move slowly on its own when it's in the front or backward mode without stepping on the Throttle pedal.

The truck driver's distraction could not be prevented because there was no predefined policy or procedure of assigning unfinished tasks to another Operator. Hence, it is likely that at some stage, lack of coordinated task allocation and ramp coordination may cause accidents and incidents due to unforeseen changes and pressure.

2.3 Adherence to the company's policy

Ground handling agents like SAHCO plc have operations standards outlined in the IATA Ground Operations Manual (IGOM), which are usually localised or adopted.

According to the Ground Support Equipment (GSE) driver, he was providing conveyor belt service to an aircraft when he was called upon to service the lavatory system of 5N-DAB. This contravenes *SAHCO's plc SOP 3.5.2. (When the conveyor belt is used, the equipment operator should always be available there).*

Investigation revealed that the reason the GSE driver was instructed to abandon the conveyor belt service to attend to 5N-DAB is connected to an inadequate workforce at the ramp.

Another GSE operator should have been assigned to provide the required services for 5N-DAB.

After positioning the truck with the aid of SAHCO GSE marshaller, it was put on chocks. The driver realised his hands could not reach the aircraft lavatory drain valve. The GSE driver requested the GSE marshaller to guide him to reposition the truck closer to the



5N-DAB

aircraft. The investigation considers that if the GSE driver was accurately marshalled to 5N-DAB the first instance, he wouldn't have needed to request repositioning. Hence, the occurrence probably would have been avoided.

According to the marshaller, he immediately removed the chock behind the lavatory service truck's tyre. Without waiting for the Marshaller's clearance and communications, the GSE driver abruptly reversed the lavatory service truck. There was a loud noise as it impacted the aircraft, further moved underneath it, and was finally stopped by a Catering Service truck servicing the same aircraft on the left side.

The GSE driver did not wait to establish eye contact/communication or be marshalled accordingly after the repositioning request. This contradicts various operational documents, including SAHCO's plc GOM 7.1.3.5, 7.1.3.6, *and SOP 3.3.4.*

Adherence to safety and operational policies, proper ramp monitoring and coordination are factors pertinent during ramp operations to negate every latent human error.

3.0 CONCLUSION

3.1 Findings

1. 5N-DAB was parked at stand D8, boarding passengers for the fourth sector.
2. While passengers were boarding 5N-DAB, the pilot requested for SAHCO to service the aircraft lavatory.
3. The GSE driver was licensed, trained and qualified for his responsibilities.
4. The GSE driver was operating a conveyor belt on another aircraft when he was called to operate a lavatory service truck on 5N-DAB.
5. There is no evidence to suggest that another SAHCO personnel was asked to take over the conveyor belt services.
6. The SAHCO Lavatory Service truck was not guided accurately when positioning to service 5N-DAB.
7. Upon Positioning to service 5N-DAB, the Lavatory Service truck was put on chock
8. The GSE driver realised that his hands could not reach the aircraft's lavatory drain valve and requested the GSE marshaller to guide him to reposition the truck closer to the aircraft.
9. While repositioning, the GSE driver of the lavatory service truck; instead of depressing the brake pedal stepped on the throttle pedal resulting in the truck impacting 5N-DAB.
10. Communication was not established between the driver and the marshaller for the repositioning.
11. The lavatory service truck passed underneath the aircraft and continued moving until it hit a Catering Service truck servicing 5N-DAB.
12. The Catering Service truck suffered minor damage.
13. Passenger boarding on 5N-DAB was stopped, and the onboard passengers disembarked.
14. After the incident, the GSE driver tested negative to multi-drug screening.

3.2 Causal factor

Abrupt stepping on the Throttle Pedal instead of the Brake Pedal, causing the truck to impact the parked aircraft's tail section.

3.3 Contributory factor

1. Less than adequate ramp supervision/coordination of SAHCO's GSE operations.
2. Inadequate workforce in the operation of SAHCO's ramp activities in handling more than one aircraft simultaneously.
3. Non-compliance with various sections of SAHCO's Operational and Ground Operation Manuals.
4. Lack of standard procedure for changing duties from one unfinished task to another.
5. The GSE Truck was not accurately marshalled the first time while positioning to service Max Air aircraft.
6. The GSE Truck did not wait to be marshalled after requesting to reposition.

4.0 SAFETY RECOMMENDATIONS

4.1 Safety recommendation issued in the preliminary report

4.1.1 Immediate Safety recommendation 2022-024

SAHCO Plc should ensure adherence to the provision section 19 (1) of the Civil Aviation (Investigation of Air Accidents And Incidents) Regulations 2019 regarding tampering with evidence which is now section 3.5 of the Civil Aviation (Investigation of Air Accidents and Incidents) Regulations, 2023.

4.2 Safety recommendation issued in this report

4.2.1 Safety recommendation 2024-012

SAHCO plc should ensure adherence to its Standard Operating Procedures and provisions in its manuals including sections section 3.3.4 and 3.5.2 and section 7.1.3.5 and 7.1.3.6 of its Ground Operations Manual.

4.2.2 Safety recommendation 2024-013

SAHCO plc should ensure availability of adequate manpower at the ramp to cater for different operations occurring simultaneously.

4.2.3 Safety recommendation 2024-014

SAHCO plc should ensure that its operations are well coordinated and adequately supervised.