سلطنة عُمان
وزارة النقل والاتصالات وتقنية المعلومات
Sultanate of Oman
Ministry of Transport, Communications and Information Technology

Oman Transport Safety Bureau (OTSB)

Final Report

OTSB Case File No: AIFN-005/07/2024

Runway Excursion (RE) at Muscat International Airport (OOMS) on Runway 08L

Name of The Operator: Cham Wing
Make and Model of The Aircraft: Airbus A320-231
Nationality and Registration Marks: Syrian, YK-BAE
Location of the Occurrence: MCT, 23°35′36″N 058°17′04″E
State of Occurrence: Sultanate of Oman
Date and Time of Occurrence: 18th July 2024, 22:40 UTC

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Purpose of the Investigation

The investigation was conducted by the Air Accident Investigation Section of the Oman Transport Safety Bureau (OTSB) pursuant to Civil Aviation Law 76/2019 Chapter 10, and in compliance with the Civil Aviation Regulation CAR-13.011 - Aircraft Accident & Incident Investigation & Reporting Procedures. The investigation was in conformance with the standards and recommended practices in Annex 13 - Aircraft Accident and Incident Investigation to the Convention on International Civil Aviation Organization (ICAO).

The sole objective of the investigation of an accident and incident is to prevent future aircraft accidents and incidents and not to apportion blame or liability.

Oman Transport Safety Bureau issue the Final Report in accordance with the national and international standards and industry best practice.

The Final Report will be publicly available at:

http://www.mtcit.gov.om

Oman Transport Safety Bureau

Ministry of Transport Communications and Information Technology

The Sultanate of Oman

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Abbreviation	Description
AAIS	Air Accident Investigation Section
AD	Airworthiness Directive
ADC	Aerodrome Controller
AME	Aircraft Maintenance Engineer
AMM	Aircraft Maintenance Manual
AMSL	Above Mean Sea level
AFL	Actual Flight Level
AAI	Air Accident Investigations
ANSIC	Air Navigation Service Incident Coordinator
AOC	Air Operating Certificate
AOT	Alert Operators Transmission
APP	Approach
ATC	Air Traffic Control
ATCO	Air Traffic Control Officer
AWY	ATC Airway
BEA	Bureau d'enquêtes et d'analyses pour la sécurité de l'aviation civile
BITE	Built-in Test Equipment
BSCU	Braking & Steering Control Unit
CAA	Civil Aviation Authority
CAL	Civil Aviation Law
CM	Centimeter
CVR	Cockpit Voice Recorder
DFDR	Digital Flight Data Recorder
DGMET	Directorate General of Meteorology
DGAN	Directorate General of Air Navigation
ECAM	Electronic Centralized Aircraft Monitor
F/CTL	Flight Control Fault
FDM	Flight Data Monitoring
FIR	Flight information Region
FL	Flight level
FO	First Officer
FOD	Foreign Object Debris
FPL	Flight Plan
FPM	Feet Per Minute
Ft	Feet
G/S	Ground Speed

ICAO	International Civil Aviation Organization
IIC	Investigator-In-Charge
KTS	Knots
LAF ACC	Load Alleviation Function Acceleration
LGCIU	Landing Gear Control and Interface Unit
LPC	License Proficiency Check
LPR	Language Proficiency Requirements
MATSOP	Manual of Air Traffic Standard Operating Procedures
MCDU	Multipurpose Control and Display Unit
MCT	Muscat
MSG	MeteoSat-9 Second Generation
NCM	Night time Cloud Microphysics
ND	Navigation Display
NM	Nautical Mile
NWS	Nose Wheel Steering
OMSJ	Sharjah International Airport
OOMS	Muscat International Airport
OPC	Operator Proficiency Check
OSDI	Damascus International Airport
OTSB	Oman Transport Safety Bureau
PF	Pilot Flying
PFD	Primary Flight Display
PM	Pilot Monitoring
PSI	Pounds per Square Inch
QAR	Quick Access Recorder
RDR	Radar
REV	Reverser
QRH	Quick Reference Handbook
ROC	Rate of climb
ROD	Rate of descent
RVSM	Reduced Vertical Separation Minima
RWY	Runway
SEP	Separation
SCCM	Senior Cabin Crew Member
SOP	Standard Operating Procedures
SQK	Squawk
VMC	Visual meteorological conditions

Synopsis

Oman Transport Safety Bureau (OTSB) was notified of the serious incident by the Sultanate of Oman Civil Aviation Authority (CAA) -Directorate General of Air Navigation (DGAN), Air Navigation Service Incident Coordinator (ANSIC)through OTSB email on 20th July 2024 at 12:06 LT). The serious incident occurred on 18th July 2024 at 22:41 UTC.

On the 18th July 2024 at 19:32 UTC, Cham Wing aircraft SAW781 with registration marks YK-BAE, an Airbus A320-321 departed from Damascus International Airport (OSDI), Syria on an international scheduled flight with intended destination Muscat International Airport (OOMS), Muscat, Sultanate of Oman.

The Tower Air Traffic Controller (TWR-ATCO) reported that on the 18th July 2024 aircraft SAW781 landed on Runway (RWY) 08L at 22:40. During the interview, the flight crew reported that after landing and, during deceleration the flight crew reported that the aircraft lost nose wheel steering and that the aircraft started drifting to the left of the RWY centerline. The Captain (Capt) of aircraft SAW781 also mentioned that they managed to reset the nose wheel steering and did not require any assistance to move the aircraft.

The flight crew, stated that the touch down and landing roll was smooth however during the deceleration the flight crew observed the Landing Gear Control and Interface Unit (LGCIU) 1 faults and Nose Wheel Steering (NWS) fault indications on the Electronic Centralized Aircraft Monitor (ECAM). The aircraft then started veering off to the left of the centre line of RWY 08L.

The aircraft came to a stop at the left edge of RWY 08L, the flight crew performed a reset on NWS and they were able to move the aircraft and vacate RWY 08L.

After aircraft SAW781 vacated RWY 08L, Oman Airports Operations proceeded immediately to the RWY and conducted RWY inspection. No Foreign Object Debris (FOD) were found, however there were tires markings between Y5 and Y6.

At the stand and after the aircraft came into a complete stop, maintenance engineer inspected the tires and informed the crew that due to the damages sustained on the tires they should be replaced immediately before the next flight. There were no other defects reported or found however the damaged tires were replaced, the LGCIU and NWS systems were reset and necessary tests were carried out as per the aircraft maintenance manual (AMM) and found satisfactory. The aircraft SAW781 was cleared and considered serviceable by the Aircraft Maintenance Engineer (AME) and released back to service for the next flight to Damascus International Airport (OSDI).

Following the review of the occurrence, the OTSB classified the occurrence as a Serious Incident and the Director of OTSB appointed investigator in charge (IIC) and investigation team to institute and conduct investigation. The following parties were notified:

- State of Design and Manufacturer, Airbus -France-Bureau d'enquêtes et d'analyses pour la sécurité de l'aviation civile (BEA), French Safety Investigation Authority.
- International Civil Aviation Organization (ICAO)
- State of Operator, and Registry, -Syria Civil Aviation Authority (CAA).
- Sultanate of Oman Civil Aviation Authority (CAA)

An investigation team was appointed and investigation was conducted in conformance with the ICAO Annex13, CAR 13 and OTSB Investigation procedures. The Sultanate of Oman is the State of

Occurrence. The following parties were involved in the investigation through their appointed accredited representatives and advisers:

- State of Design and Manufacturer-Airbus-France-Bureau d'enquêtes et d'analyses pour la sécurité de l'aviation civile (BEA), French Safety Investigation Authority.
- State of Operator and Registry--Syria Civil Aviation Authority (CAA)

The Final Report issued on 10th July 2025 and the Final Report will be made public at the below link:

www.mtcit.gov.om

Unless otherwise mentioned, all times in this report are UTC. Local Time in The Sultanate of Oman is UTC plus +4 hours. Photos and figures used in this report were obtained from Cham Wings - the Operator, BEA and Directorate General of Meteorology (DGMET)-CAA and are adjusted from the original for the sole purpose of improving the clarity of the report. Modifications to images used in this Report are limited to cropping, magnification, file compression, or enhancement of colour, brightness, contrast or insertion of text boxes, arrows or lines.

1. FACTUAL INFORMATION

1.1. History of Flight

1.1.1 On the 18th July 2024 at 19:32 UTC, Cham Wing aircraft SAW781 with registration marks YK-BAE, an Airbus A320-321 departed from Damascus International Airport (OSDI), Syria on an international scheduled flight with intended landing destination at Muscat International Airport (OOMS), Muscat, Oman.

1.1.2 At the time 22:27:53 the flight crew reported to Muscat Approach (APP) Air Traffic Controller (APP-ATCO) that they were descending through Flight Level (FL) 166 to FL160.

1.1.3 At the time 22:28:30, aircraft SAW781 was at 50 nautical miles (NM) descending through FL156, with a rate of descent (ROD) of 2500 Feet Per Minute (FPM) and a ground speed (G/S) of 397 knots (KTS).

1.1.4 At the time 22:32:02, the APP ATCO cleared the flight crew to descend to 3000FT for ILS RWY 08L and to report when ILS is established.

1.1.5 At the time 22:33:07, aircraft SAW781 was observed on ATC radar screen at 25NM descending through to ALT 5700FT, with ROD of 1800 FPM and a ground speed (G/S) of 302 KTS.

1.1.6 At the time 22:35:42, APP ATCO requested the flight crew to contact Tower (TWR) ATCO by stating “SAW781 contact TWR now 118.825 مع السلامة”. At the time 22:35:46, the flight crew readback to APP ATCO by stating” 118.825 SAW781 مع السلامة”. At the time 22:35:57, the flight crew established contact with TWR ATCO and reported that they were 12NM from OOMS and have established ILS for RWY 08L.

1.1.7 At the time 22:36:04, the TWR ATCO provided weather information to the flight crew as wind calm and issued clearance to land. At the time 22:36:11, the fight crew acknowledged the clearance by stating “SAW781: Clear to land RWY 08L SAW781”. At the time 22:36:31, aircraft SAW781 was at 10NM from OOMS descending through altitude 2900FT, with ROD of 900 FPM and a G/S of 221 KTS. At the time 22:38:03, aircraft SAW781 was at 5NM from OOMS descending through ALT 1600FT, with ROD of 800 FPM and a G/S of 165 KTS.

1.1.8 According to the Flight Data Management (FDM) recording the aircraft touched down at the time 22:39:53 at a heading of 083° on RWY 08L. At the time 22:40:43 aircraft speed was 49 knots, the crew lost rudder authority and the aircraft started veering off to the left of RWY 08L center line. Then the aircraft came to a complete stop at the time 22:41:00 on a heading 065° which is 18° to the left of RWY 08L center line.

1.1.9 The TWR ATCO further reported that at the time 22:40 aircraft SAW781 landed on RWY 08L. After landing and while vacating the RWY, the flight crew reported to ATCO a loss of nose wheel steering and that the aircraft had veered off from the centerline of RWY 08L, but the flight crew did not report that the aircraft veered off the RWY centerline and stopped at the left edge of RWY 08L. The flight crew further mentioned to the TWR ATCO that they managed to reset the nose wheel steering and did not require any assistance.

1.1.10 At the times 22:42 and 22:43 aircraft OMA281 and aircraft IGO1274 were holding short off RWY 08L respectively for more than 10 minutes due to Oman Airports (OA) operations conducting RWY inspection. At the time 22:56, Oman Airports advised the TWR ATCO that the RWY is clear and no Foreign Object Debris (FOD) were found on the RWY.

1.1.11 As per the FDM recording, at the time 22:40:03, the reverse (REV) thrust indication came on and went off at the time 22:41:07 lasting for 64 seconds. At the time 22:40:30, aircraft SAW781 landed on RWY 08L.

1.1.12 At the time 22:41:07, TWR ATCO instructed the flight crew to vacate the runway by stating "SAW781 vacate right Y6 right on W correction right on D correction V to U D". As per the FDM recording, at the time 22:41:16 the aircraft was observed moving to the right. At the time 22:41:24, the flight crew started taxing again by using differential power to keep the aircraft SAW781 straight while taxiing.

1.1.13 At the time 22:41:35, the TWR ATCO contacted the flight crew again as there was no response from the flight crew. At the time 22:41:37, the flight crew responded to the TWR ATCO by stating "SAW781 MCT TWR".

1.1.14 During the interview, the flight crew reported that during the turn to the right towards Y6 taxiway, they used the left-hand throttle power to move the aircraft SAW781 from the halted position and steered aircraft SAW781 to the right to continue taxiing to the stand. At the time 22:41:39, the aircraft SAW781 was observed on the FDM recording on a heading 106° taxiing towards taxiway Y6.

1.1.15 At the time 22:41:42, the TWR ATCO asked the flight crew if everything was okay by stating "Yeah is everything ok?" At the time 22:41:43, the flight crew reported to the TWR ATCO by stating "I think we are loosing nosewheel steering".

1.1.16 At the time 22:41:47, the flight crew reported to the TWR ATCO by stating "recover now but we are loosing nosewheel steering upon landing". At the time 22:41:55, the flight crew reported to the ATCO that they were recovering by stating "we are vacating now recovery".

1.1.17 At the time 22:41:57, the TWR ATCO requested the flight crew to vacate the RWY via taxi way Y6 by stating "OK SAW781 to vacate via Y6 and then turn right on V". At the time 22:42:03, the flight crew readback by stating "Y6 turn right on V SAW781".

1.1.18 At the time 22:42:44 the aircraft was observed on the FDM recording moving directly towards Y6 taxiway on a heading 175° and flaps were moved to up position.

1.1.19 At the time 22:46:35, the TWR ATCO requested the flight crew to proceed all the way and then turn left on taxiway T to stand 304. At the time 22:46:41, the flight crew readback by stating "Left on T to stand 304 SAW781".

1.1.20 At the time 22:47:14 (The TWR was heard on the ambient recording explaining the situation to the ground controller): I observed SAW781, after landing, exiting the RWY from Y5 to Y6. It made an unusual turn; normally, an aircraft turns like this, but instead, it turned like this. It seemed to skip, so I instructed it to vacate the RWY. I asked the pilot if everything was normal, and he responded that they had lost steering while landing. Operations asked if there were any issues, and I informed them that SAW reported a loss of steering.

1.1.21 At the time 22:49:28, the TWR ATCO called the flight crew. At the time 22:49:29, the flight crew acknowledged by stating "Go ahead SAW781". At the time 22:49:30, the TWR ATCO asked the flight crew to confirm if they were unable to turn by stating "Confirm you are unable to turn?". At the time 22:49:31, the flight crew responded to the TWR ATCO by stating "Now we are turning to Tango we are ahhh ok sorry we are on T but…. we are turning now able".

1.1.22 At the time 22:49:48, the TWR ATCO asked the flight crew if they were supposed to go left by stating "Are you supposed to go left to stand 304 SAW781". At the time 22:49:53, the flight crew responded to the TWR ATCO by stating "We are turning to T".

1.1.23 At the time 22:50:07, the flight crew reported to the TWR ATCO that they were turning left by stating "We are turning left to T SAW781". At the time 22:50:35, OA OPS3 reported to the TWR ATCO that the traffic turned left by stating "The traffic turned left from the edge of the RWY".

1.1.24 At the time 22:50:35, OA OPS3 reported to the TWR ATCO that the aircraft SAW781 turned left from the edge of the RWY. At the time 22:50:38, the TWR ATCO requested OA OPS3 to affirm that aircraft SAW781 while landing he lost the steering and if the aircraft SAW781 was out of the RWY. At the time 22:50:50, OA–OPS3 affirmed to the TWR ATCO that aircraft SAW781 was stopped on the RWY 08L left edge and the right turn was made with the left wheels out of the left edge white line marking of RWY 08L. At the time 22:51:00, the TWR ATCO responded to OA OPS3 that the flight crew, said they lost the steering and the aircraft SAW781 went out of RWY 08L. The flight crew further reported that no assistance was required.

1.1.25 At the time 22:50:38, the TWR ATCO contacted the flight crew to affirm by stating “confirm the traffic while landing he just took left on the RWY he took little bit he was out of the RWY little bit he said we lost the steering”.

1.1.26 At the time 22:50:50, OA OPS3 reported to the TWR ATCO that the aircraft had turned right at the left edge. The TWR ATCO stated that he has no idea as the flight crew reported they have lost the steering and never reported that the aircraft went out of the RWY.

Figure 1: showing evidence of left main wheel tire marks outside the left edge of the RWY 08L.

1.1.27 At the time 22:52:37, the flight crew contacted the TWR ATCO and at the time 22:52:40, ATCO responded by stating “Yeah go ahead SAW781”. At the time 22:52:44, the flight crew reported to the TWR ATCO they lost the steering by stating “Just lost the steering for 5 seconds so we go slightly left of the center line then we reset it back to normal”.

1.1.28 At the time 22:52:54, the TWR ATCO contacted the flight crew to confirm if everything was ok by saying “Roger that confirm everything is ok now?”. At the time 22:52:55, the flight crew responded that they are at the gate and the steering was ok by stating “Yes, we are at the gate now it’s ok the steering is ok”.

1.1.29 At the time 22:56:13, OA OPS3 informed the TWR ATCO that the RWY was clear by stating “RWY is clear nothing to report”. Then at the time 22:56:23 TWR ATCO cleared flight crew of OMA281 for take-off by stating “OMA281 wind calm clear for take-off 08L RDR 121.2” and at time 22:58:24 TWR cleared IGO1274 for take-off by stating “IGO1274 wind calm clear for take-off 08L RDR 121.2”

1.1.30 During the interview, the Capt who was the Pilot Monitoring (PM) stated that, the departure flight from OSDI was normal. The take-off, cruise, approach with good weather. The landing at OOMS RWY 08L was reported to be smooth and safe however, during the deceleration the flight crew observed on Electronic Centralized Aircraft Monitor (ECAM) the Landing Gear Control and Interface Unit (LGCIU) 1 fault and Nose Wheel Steering (NWS) fault indications. The aircraft then started drifting to the left of the center line of RWY 08L.

1.1.31 The Capt took control from the First Officer (FO) who was the Pilot Flying (PF) in an attempt to compensate the drift by using the rudder pedals with no success even after trying the normal braking. The Capt then opted to revert back to alternate braking by requesting the FO to set NWS switch to off position. The aircraft SAW781 stopped just outside the left edge of RWY 08L, parking brake was applied and NWS was reset as per the Quick Reference Handbook (QRH). Following the reset of NWS, operations became normal, the flight crew of aircraft SAW781 taxied the aircraft to vacate the RWY to their allocated gate.

1.1.32 During the interview the FO stated, that following the ECAM messages on LGCIU and NWS, the flight crew tried to use the rudder but the effect was very minimum and the aircraft was veering off to the left with force and the normal braking was not working effectively. The flight crew used the alternate brake system and the aircraft SAW781 stopped on the left edge of RWY 08L. After arriving at the gate, the flight crew called the maintenance team to check the aircraft SAW781. The flight crew reported that they saw Thrust Reverser light indication.

1.1.33 The flight crew reported that the aircraft SAW781 experienced similar incident with more speed, after landing at OSDI, Syria and the aircraft SAW781 veered off to the left of the RWY. ECAM the LGCIU 1 fault and Nose Wheel Steering (NWS) fault indications. The incident was reported to the ground Aircraft Maintenance Engineer (AME), the incident that occurred at OSDI resulted in one main tire damage. The AME carried out tire change as per the aircraft maintenance manual (AMM) following which the aircraft was released to service.

1.1.34 During the interview, the Senior Cabin Crew Member (SCCM) stated that when the aircraft SAW781 began to descend towards OOMS, the cabin crew prepared the cabin for landing, passengers fastened their seatbelts, galleys and lavatories were secured. All cabin crew sat in their respective seats (seat belts and shoulder harness fastened). The SCCM reported to the Capt that the cabin is secure and ready for landing. The aircraft SAW781 landed normally then stopped at the RWY. After approximately 45 seconds the aircraft SAW781 continued normal taxi to the gate. Once the aircraft SAW781 came to a complete stop, doors were disarmed, and displayed with the Capt on ECAM as usual.

1.1.35 The SCCM further stated that, a representative from Oman Airports (OA) Safety authorities at OOMS came and requested to see the Capt. The Capt went down to check the wheels with the maintenance team. The maintenance team after inspecting the tires, informed the Capt that due to the damages sustained on the mainwheel tires, the mainwheel tires must be replaced before the next flight. The flight crew went to the lounge to get rest while the main wheels were being replaced and the aircraft being prepared for the next flight.

1.1.36 Following the mainwheel tires replacement by the AME, both the LGCIU and NWS were reset and the system check was found satisfactory. The aircraft SAW781 was certified and released to serviceable and flown back to OSDI.

1.1.37 The TWR ATCO requested the OA operations to conduct the RWY inspection. Following the RWY inspections, the OA operations informed the TWR ATCO that aircraft SAW781 had veered one meter off the edge white line marking of the RWY and that one of the landing wheels was damaged. The flight crew never reported exiting the RWY. The TWR ATCO followed up with the flight crew who replied that they lost steering for 5 seconds, causing the aircraft to drift slightly to the left of the RWY centerline. The TWR ATCO further stated that the flight crew of aircraft

SAW781 advised that they managed to reset the NWS system and continued taxing as normal. Furthermore, they continued vacating the RWY through taxiway Y6.

1.2. Injuries to Persons

1.2.1 No injuries were reported.

Injuries	Pilot	Crew	Pass.	Total on Board	Other
Fatal	-	-	-	-	-
Serious	-	-	-	-	-
Minor	-	-	-	-	-
None	-	-	-	-	-
No Injuries	2	4	133	139	-
Total	2	4	133	139	**-**

Note: Other means people on the ground.

1.3. Damage to Aircraft

1.3.1. Photos below showing substantial damages on number 1 and 2 main wheels tires.

Figure 2: Showing damages sustained on the right main tires (number 1 and 2).

1.3.2 The airplane underwent flight servicing before flight, which included a tire condition inspection and pressure check. According to the aircraft flight log the wheels, tire condition and tires pressures was normal during the service check. A post-incident visual check and examination revealed that all the damages were as a result of the serious incident.

1.3.3 Below table shows the tire pressures post the serious incident:

Details of Tires Pressures of the Tires which were Replaced In MCT				
Item	Part P/N	S/N	Pressures	Size of Area OF Damages
1	C20195162	40574	Unknown	Unknown
2	C20195162	40822	200 PSI	360 CM
3	C20195162	37222	115 PSI	300 CM

1.4. Other Damage

1.4.1 No other damages were reported.

1.5. Personnel Information

1.5.1 Pilot-in-command (Pilot Flying)

Nationality	Syrian		
Medical Validity	02nd-Aug-2025	Licence Type	Airline Transport Pilot Aeroplane
Licence Validity	Valid for life	Type Endorsed	A320
Ratings	Instrument Rating, Multi-Engine, A320		
English Language Proficiency Level, Issue and Expiry Date		Level 6. Expiry Date: TBA	
LPC Issue Date	05th-Jun-2024	OPC Issue Date	05th-Jun-2024
LPC Expiry Date	30th-Jun-2025	OPC Expiry Date	31st-Jun-2025
Restrictions	Nil		
Previous Accidents	Nil		

Note: Previous accidents/incidents refer to past accidents/incidents the pilot was involved in, when relevant.

Flying Experience:

Total Hours	8485:00
Total Past 24 Hours	07:00
Total Past 7 Days	12:20
Total Past 30 Days	68:05
Total Past 90 Days	114:45

1.5.2 First officer (Pilot Monitoring)

Nationality	Syrian		
Medical Validity	30th-Apr-2025	Licence type	Commercial Pilot Aeroplane
Licence Validity	Valid for Life	Type Endorsed	Yes
Ratings	Instrument Rating, Multi-Engine, A320		
English Language Proficiency Level, Issue and Expiry Date		Level 5,30th-Apr-2030	
LPC Issue Date	03rd-Jun-2024	OPC Issue Date	03rd-Jun-2024
LPC Expiry Date	30th-Jun-2025	OPC Expiry Date	31st-Dec-2024
Restrictions	None		
Previous Accidents	None		

Note: Previous accidents/incidents refer to past accidents/incidents the pilot was involved in, when relevant.

Flying Experience:

Total Hours	1928:00
Total Past 24 Hours	07:00
Total Past 7 Days	07:00
Total Past 30 Days	07:00
Total Past 90 Days	117:50

1.5.3 Cabin in Charge:

Nationality	Syrian		
Medical validity	06th Jun 2025	Licence type	Cabin Crew
Licence validity	15th Apr 2025	Type endorsed	Yes
Ratings	TBA		
Latest Line Check Issue and Expiry Date		10th Oct 2023 and 31st Oct 2024	
Restrictions		None	

Note: Previous accidents/incidents refer to past accidents/incidents the pilot was involved in, when relevant.

Flying Experience:

Total Hours	2921:15
Total Past 24 Hours	00:00
Total Past 7 Days	11:20
Total Past 30 Days	64:05
Total Past 90 Days	166:20

1.5.4 **Air Traffic Controller (ATCO)**

Nationality	Omani		
Medical valid	03rd Oct 2024	Licence type	Air Traffic Controller
Licence valid	31st Dec 2026	Type endorsed	Yes
English Language Proficiency Level, Issue and Expiry Date			Level 5,14th Jul 2026
Ratings	ADC, APP RDR		
Restrictions	None		

1.5.4.1 The ATCO was issued with Air Traffic Controller license by Oman CAA on the 21st December 2011 and a proficiency check was conducted on the 18th Feb 2024 with an expiry date of the 31st December 2026.

1.5.5 **Aircraft Maintenance Engineer (AME) Oman Air**

Nationality	Omani		
Licence type	Aircraft Maintenance Engineer		
Licence valid	10th Mar 2026	Type endorsed	Yes
Ratings	Airbus A320 to A321 and Airbus A320 to A319		
Restrictions	None		

1.5.5.1 The AME licence was initially issued on 12th May 2007. The licence is valid from 05th June 2024 to 10th March 2026 with A & C/B1 categories.

1.5.6 **Aircraft Maintenance Engineer (AME) Cham Wing**

Nationality	Syrian		
Licence type	Aircraft Maintenance Engineer		
Licence valid	06th Sep 2025	Type endorsed	Yes
Ratings	Airframe A320, Engine A318, A319, A320, A321 (CFM 56), Engine A319/A320/A321 (IEA)		
Restrictions	None		

1.5.6.1 The AME licence was initially issued on 04th September 2023. The licence is valid from 04th September 2023 to 05th September 2025.

1.6. **Aircraft Information**

1.6.1 The Airbus A320 family is a series of narrow-body airlines developed and produced by Airbus. The A320 was launched in March 1984, first flew on 22nd February 1987, and was introduced in April 1988 by France. The first member of the family was followed by the stretched A321 (first delivered in January 1994) The A320 is 37.6 m (123 ft) long and can accommodate 150 to 186 passengers. The 44.5 m (146 ft) A321 offers 185 to 230 seats. The Airbus Corporate Jets are modified business jet versions of the standard commercial variants. The 320-232 has IAEV2500 engines.

Airframe:

Manufacturer/Model	Airbus A320-321	
Serial Number	0322	
Year of Manufacture	23/09/1992	
Total Airframe Hours (At Time of Serious Incidents)	67897 FH	
Last Inspection (Date & Hours)	65795 FH	17/11/2023
Last Inspection Airframe Cycles (CSN)	34083 FC	
Airframe Hours Since Last Inspection	2144 FH	
Type of inspection performed	C check	
C of A (Issue Date & Expiry Date)	17/11/2023	16/11/2024
C of R (Issue Date)	08/11/2017 (MARS AEROPARTS TRADING FZE)	
Operating Category	II-Transport (passenger)	
Type of Fuel Used	MOBIL JET A1	
Previous accidents	None	

Note: Previous accidents/incidents refer to past accidents/incidents the aircraft was involved in, when relevant to this incident.

1.6.2 On the 8th April 2023, the Syrian CAA approved the Operator Cham Wings Airlines Minimum Equipment List (MEL) which allowed them to operate an aircraft with unserviceable items for a certain period.

1.6.2.1 The operator recorded the following incidents as per their MEL:

(a) On the 18th April 2024, the operator reported and opened defect regarding LAF ACC FAULT F/CTL without closing date up to the date of the incident,

(b)On the 16th June 2024, the operator reported DMC #1 Inoperative which was closed on the 03rd July 2024 and extended to the 06th July 2024,

(c)On the 19th June 2024, ENG #2 Thrust Reverser deactivated and closed on the 23rd June 2024,

(d) On the 24th June 2024, ENG#2 Thrust Reverser deactivated and closed on the 14th July 2024,

(e) On the 25th June 2024, brake fan system partially available “FAN 1 and 2 deactivated” and was opened at the time of the incident,

(f) On the 26th June 2024, ENG#1 ignition system had a fault and was closed on the 29th June 2024,

(g)On the 29th June 2024, ENG#1 ignition system had a fault and was closed on the 16th July 2024 and then extended to the 19th July 2024,

(h) On the 08th July 2024, ENG#1 Thrust Reverser deactivated and closed on the 10th July 2024,

(i) On the 15th July 2024, ENG#2 Thrust Reverser deactivated and was opened at the time of the incident.

(j) On the 18th July 2024, ENG#1 IGN had a fault and was opened at the time of the incident.

1.6.2.2 According to the above records there were 4 open defects at the time of the incident:

(a) Load Alleviation Fault (LAF) Air Combat Cloud (ACC) FAULT Flight Control (F/CTL),

(b)Brake fan system partially available “FAN 1 and 2 deactivated”,

(c)ENG#2 Thrust Reverser deactivated,

(d)ENG#1 IGN had a fault.

History of LGCIU Landing Gear Control Interface Unit:

Installation Date	DESCRIPTION	Part Off		Part On		REMOVED REASON WORKED FC FOR OFF PART
		P/N	S/N	P/N	S/N	
30.04.2024	LGCIU-LANDING GEAR CONTROL INTERFACE UNIT	664700500A4D	987	664700500A4D	532	LGCIU FAULT 116 FC
25.06.2024	LGCIU-LANDING GEAR CONTROL INTERFACE UNIT	664700500A4D	1473	664700500A4D	987	FOR TBS/ FC UNKNOWN
09.07.2024	LGCIU-LANDING GEAR CONTROL INTERFACE UNIT	664700500A4D	532	664700500A4D	1473	FOR TBS 350 FC
02.08.2024	LGCIU-LANDING GEAR CONTROL INTERFACE UNIT	664700500A4D	987	664700500A4D	752	LGCIU FAULT 163FC

History of Braking/Steering Control Unit (BSCU):

Installation Date	DESCRIPTION	Part Off		Part On		REMOVED REASON WORKED FC FOR OFF PART
		P/N	S/N	P/N	S/N	
13.01.2024	BSCU-BRAKING AND STEERING CONTROL UNIT	E21327106	7526	E21327106	6081	BSU SYST #1 FAULT
13.04.2024	BSCU-BRAKING AND STEERING CONTROL UNIT	E21327106	6081	E21327106	8079	BSCU component replaced for TSM
30.04.2024	BSCU-BRAKING AND STEERING CONTROL UNIT	E21327106	8079	E21327106	8862	F/O PEDALS DISC P.B FUNCTION INOP IN BOTH SYS 1/2

Details of Wheel Tires which were Replaced In OOMS				
Item	Part Off P/N	S/N OFF	Part On P/N	S/N On
1	C20195162	40574	C20195162	36972
2	C20195162	N/A	C20195162	62423
3	C20195162	37222	C20195162	53115
Details of Wheel Tires which were Replaced In OSDI				
Item	Part Off P/N	S/N OFF	Part On P/N	S/N On
3	C20206150	62423	C20206150	44323

According to the aircraft Technical Log Book (REF:31969) The nosewheel tire was replaced due to the flat spot identified during the daily pre-flight inspection check on 21st July 2024. The standby main wheel in the cargo was also changed.

Details of Proximity Sensor Fin 26GA, Ref 31968 (Aircraft Technical Log Book)				
Item	Part Off P/N	S/N OFF	Part On P/N	S/N On
1	8-933-01	A67000	8-933-01	N/A

Aircraft Technical Log Book Flight dated the following:

1) 18th July 2024, OKKK - OSDI no defects reported.
2) Ref 31967: 18th July 2024, OSDI - OOMS incident flight, aircraft was declared serviceable after the number 1,2 and 4 main wheels tires which worn-out tires were replaced.
3) Ref 31968: 19th July 2024, OOMS- OSDI, aircraft was declared serviceable after the worn-out tires for the number 1 and 2 nose wheels tires and the proximity sensor replaced. The nose wheel tires 1 and 2 were replaced due to being worn out.
4) Ref 31969: 21st July 2024 daily pre-flight check at OSDI, same faults as on 18th July 2024 in OOMS appeared and nose wheel tires were replaced due to flat spot. Functional tests conducted successfully.
5) Ref 31970: 22nd July 2024, OSDI - OSDI transit and prefight check flights conducted and the crew reported nil remarks.
6) On 22nd July 2024, OSDI - OLBA transit check flight conducted and the crew reported nil remarks.7) On 27nd July 2024, OMSJ - OSDI after lowering the landing gear the crew reported unknown vibrations. The aircraft veered to the left after landing even without using the thrust reversers. LGCIU #2 fault message appeared.

8) According to the Aircraft Technical Log Book the aircraft was released by the AME on 19 July 2024 at 14:20 UTC. The FO did walk around on the same day at 14:30 UTC and the Capt accepted the aircraft at 14:35 UTC on the same day.

1.6.3 The LGCIU 1 data was requested by the OTSB however it was not shared by the state of registry.

1.6.4 According to the maintenance records the LGCIU 1 calculator was not replaced following the incident.

1.6.5 Following the serious incident, the flight crew stopped the aircraft on the side of RWY edge white line marking and reset the system as required by the QRH before proceeding to the allocated gate.

1.6.6 Following the serious incident, the AME conducted a Built-in Test Equipment (BITE) check of the landing gear control interface unit (LGCIU) using multipurpose control and display unit (MCDU) to ensure that continuous BITE is operative as per aircraft maintenance manual (AMM A318/A319/A321/A320, AMM 32-69-00-740-001-A).

1.6.7 The internal BITE data from both LGCIUs was not downloaded and analysed. Functional and acceptance tests were conducted on each unit; the testing revealed no anomalies and all the indications were cleared or removed.

1.6.8 There was no read out BSCU, LGCIU as the AME checked the system and reset and cleared the WHEEL N/W STRG and LGCIU faults which were reported and reflected on the system. Following the functional tests, the system was found satisfactory and the AME declared the aircraft serviceable.

Engine 1:

Manufacturer/Model	IAE V2500-A1
Serial Number	V0011
Part Number	V2500-A1
Hours Since New	52216 FH
Hours Since Overhaul	8131 FH
Hours since last shop visit	8131 FH
Cycles Available Before Next Shop Visit	5348 FC
Oil type	MOBIL JET OIL II

Engine 2:

Manufacturer/Model	IAE V2500-A1 CFM/ LEAP-1A33
Serial Number	V0223
Part Number	V2500-A1
Hours Since New	46845 FH
Hours Since Overhaul	2745 FH
Hours since last shop visit	2745 FH
Cycles Available Before Next Shop Visit	3599 FC
Oil type	MOBIL JET OIL II

1.7. **Meteorological Information**

1.7.1. The weather information below was provided by the Directorate General of Meteorology (DGMET)-Meteorological Routine Aerodrome Report (METAR) on the 18th July 2024 at 22:50 UTC).

Wind Direction	VRB	Wind Speed	02 kts	Visibility	CAVOK
Temperature	35°C	Cloud Cover	Sky Clear	Cloud Base	Sky Clear
Dew Point	24°C	QNH	0993 HPA		

Satellite Image

The Night time cloud microphysics RGB (NCM) and 10.8um infrared (IR) satellite images of the MeteoSat-9 Second Generation (MSG) show no significant clouds only high clouds are present over Sultanate of Oman on Muscat area before (2200Z, 2215Z, 2230Z) and after the time of incident (2245Z, 2300Z). As such, Visual meteorological conditions (VMC) prevailed during the time of the serious incident.

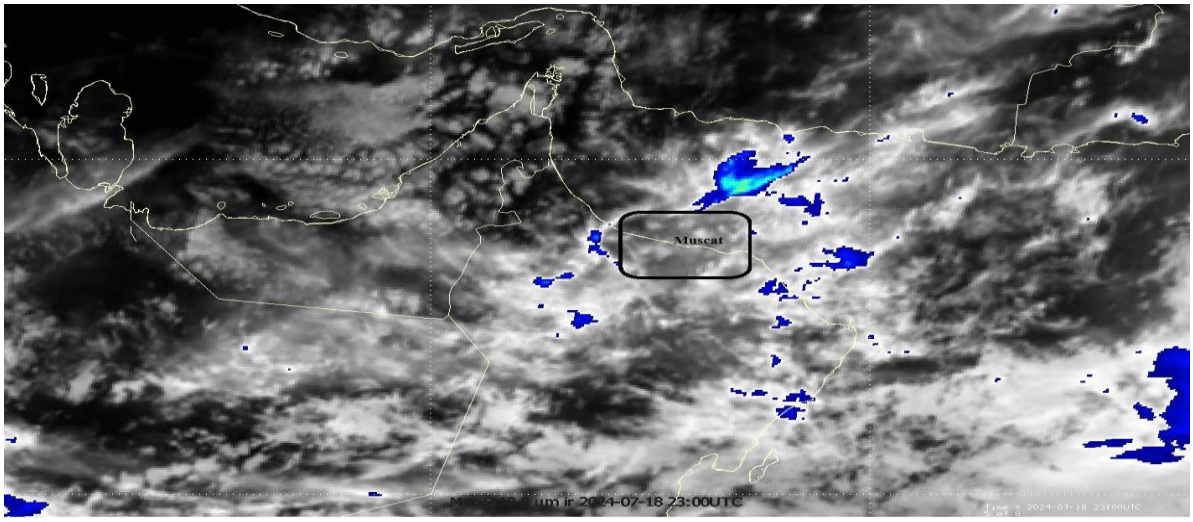

Figure 3: showing IR satellite image at the time 2245Z on the 18th July 2024 (Source: DGMET).

1.7.1 No significant weather was observed during the time of the incident and the wind almost calm.

1.8. **Aids to Navigation**

1.8.1. The aircraft was equipped with standard navigational equipment as approved by the Syrian CAA. There were no defects reported or records indicating that the navigation system was unserviceable prior to the serious incident.

1.9. **Communication**

1.9.1. The aircraft was equipped with a standard communication system as approved by the Syrian CAA. There were no records or defects reported or records indicating that the communication system was unserviceable prior to the serious incident.

1.10. **Airport Information**

1.10.1. Departure Airport:

Aerodrome Location	Damascus International Airport (OSDI)	
Aerodrome Status	Licensed Airport (Open)	
Aerodrome GPS coordinates	N33 24.7 E36 30.83	
Aerodrome Elevation	2020 FT	
RWY Headings/Designations	23L/05R	23R/05L
RWY Dimensions	3600M x 45M	3600m x 45M
Runway Used	23L	
Surface of RWY Used	Asphalt	
Approach Facilities	RNAV APP	
Category for Rescue Fire Fighting	CAT 9	

1.10.2 Destination Aerodrome:

Aerodrome Location	Muscat International Airport (OOMS)	
Aerodrome Status	Licensed Airport (Open)	
Aerodrome GPS coordinates	23°35′36″N 058°17′04″E	
Aerodrome Elevation	25 feet (ft) mean sea level (MSL)	
RWY Headings/Designations	08R/26L	08L/26R
RWY Dimensions	4080M x 60 M	4000M x60 M
RWY Used	08L	
Surface of RWY Used	Asphalt	
Approach Facilities	ILS, RNP, VOR, RWY Lights, PAPI's	
Category for Rescue Fire Fighting	CAT 10	

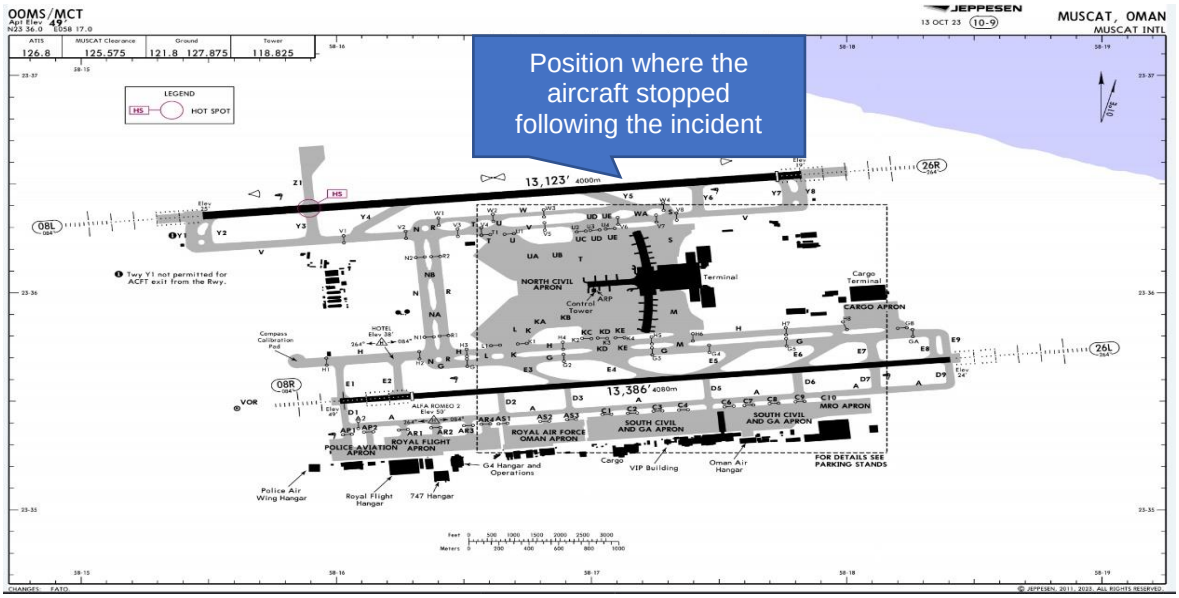

Figure 4: showing OOMS layout and where the incident happened.

1.10.3 There were no reported defects on the RWY and following the incident, OA operations conducted RWY inspection and found the RWY satisfactory with no FOD.

1.11. Flight Recorders

1.11.1 The aircraft was fitted with Digital Flight Data Recorder (DFDR), Flight Data Monitoring (FDM) and Cockpit Voice Recorder (CVR). Both DFDR, FDM and the CVR were not downloaded. OTSB relied on other sources information such as FDM and ATC communication records to assist in the investigation.

1.12. Wreckage and Impact Information

1.12.1 The aircraft touched down smoothly and normally on RWY 08L. During rolling out and deceleration, approximately 3.1 kilometres (KM) from the threshold, the aircraft then started veering to the left of RWY 08L center line and stopped just after the RWY edge white line marking. The serious incident occurred between taxiway Y5 and taxiway Y6. The aircraft sustained damages on the wheel tires only and there were no reported or recorded structural damages.

1.12.2 The touchdown was normal with the main wheel however during the nosewheel touchdown the aircraft veered to the left of the RWY.

Figure 5: showing evidence of Left-Hand Main Wheel tire marks veering to the left of RWY 08L.

1.12.3 The evidence on the RWY shows brakes was holding and releasing as per the markings on the RWY. This provides evidence that the right-hand brake pedal was applied continuously until the aircraft came to hold.

Figure 6: showing evidence of tire marks turning to the left of RWY 08L.

Figure 7: showing evidence of left wheel tire marks showing anti skids jerking outside the left edge of the RWY 08L while turning right into the RWY 08L, towards Taxiway Y6.

Figure 8: showing evidence close view of the main wheel tire damages.

1.12.4 There was evidence of brake jerking on number 1 and 2 mainwheel tires even after the NWS system was reset by the flight crew. The aircraft proceeded taxing to the allocated gate through Taxiway Y6 without further incident.

1.13. Medical and Pathological Information

1.13.1. Not relevant to the occurrence.

1.14. Fire

1.14.1. Not relevant to the occurrence.

1.15. Survival Aspects

1.15.1 Search and Rescue activities were not required as there was no fire nor injuries to the crew and passengers. The incident was considered survivable due to the fact that the aircraft remained on the RWY and the crew were able to regain control of the NWS and continued taxing the aircraft to the allocated stand 304. Both the crew and passengers were safely secured in the cabin by safety belt.

1.16. Tests and Research

1.16.1. Not relevant to the occurrence.

1.17. Organizational and Management Information

1.17.1 Cham Wings:

1.17.1.1Aircraft SAW781 was operated as a scheduled international passenger flight.

1.17.1.2The operator, Cham Wings Airlines was issued with an Air Operating Certificate (AOC) by the State of Registry and State of Operator, The Syrian Civil Aviation Authority, CAA. The certificate was issued by the CAA on 07th May 2024 with and expiry date of 10th May 2025. The certificate certifies that the Cham Wings Airlines is authorized to perform commercial air operations; as defined in the operations specifications, in accordance with operations manual and all the Syrian Civil Aviation Regulations. The aircraft had a valid Certificate of Airworthiness which was issued on 17th November 2023 with and expiry date of 16 November 2024. The aircraft had a valid Certificate of Registration (CoR) which was issued on 08th November 2017.

1.17.1.3The Operator implemented Safety Management System (SMS), whereby occurrences are reported to the relevant authorities as and when they occur and they are reviewed, categorized, classified and investigated to identify the need for any gaps, risk assessment and risk management, remedial action that are required to be taken by the organization.

1.17.2 Directorate General Air Navigation (DGAN):

1.17.2.1The service provider (DGAN) have implemented Safety Management System (SMS) which includes all its ATS units, whereby occurrences are reported to the relevant authorities as and when they occur and they are reviewed, categorized, classified and investigated to identify the need for any gaps, risk assessment and risk management and remedial action that are required to be taken by the organization.

1.18. Additional Information

1.18.1 Cham Wings Airlines: A318/A319/A320/A321 **FLIGHT CREW OPERATING MANUAL**

PROCEDURES NORMAL PROCEDURES

STANDARD OPERATING PROCEDURES - LANDING

FOR MANUAL LANDING

AP..... OFF PF

FLARE

- **AROUND 30 ft RA:**

In stabilized approach, the flare height is approximately 30 ft
FLARE..... PERFORM PF
ATTITUDE..... MONITOR PM
THRUST LEVERS.....IDLE PF
L2 Move the thrust levers to idle, and begin a gentle progressive flare to enable the aircraft to touch down without a prolonged float.
If autothrust is engaged, it automatically disconnects when PF sets both thrust levers to the

IDLE detent.
At 20 ft, an automatic "RETARD" callout will trigger, as a reminder.
L1 Note: The ground spoilers extension is inhibited if:

- Both thrust levers remain above the idle detent, or
- One thrust lever is above idle and one thrust lever is at idle detent.

FLARE
 AROUND 30 ft RA:
In stabilized approach, the flare height is approximately 30 ft.
FLARE..... PERFORM PF
ATTITUDE..... MONITOR PM
THRUST LEVERS.....IDLE PF
L2 Move the thrust levers to idle, and begin a gentle progressive flare to enable the aircraft to touch down without a prolonged float.

If autothrust is engaged, it automatically disconnects when the flight crew sets both thrust levers to the IDLE detent.
At 20 ft, an automatic "RETARD" callout will trigger, as a reminder.
L1 Note: Ground spoilers extension is inhibited if one or more thrust levers remain above the IDLE detent.

AT TOUCHDOWN

- **As soon as the main landing gear touches down:**

DEROTATION.....INITIATE PF
ALL THRUST LEVERS.....REV MAX or REV IDLE PF

L2 The flight crew must select reverse thrust immediately after landing gear touchdown.
The flight crew must immediately select REV MAX, if any of the following occurs at any time during the landing:
- An emergency
- The deceleration is not as expected
- A failure affects the landing performance
- A long flare or a long touchdown
- An unexpected tailwind.

A small pitch up may occur during thrust reversers deployment before nose landing gear touchdown. However, the flight crew can easily control this pitch up.
As soon as the flight crew selects reverse thrust, they must perform a full-stop landing.
L1 GND SPLRS.....CHECK/ANNOUNCE PM

L2 Check that the WHEEL SD page displays the ground spoilers extended after touchdown.
If no ground spoilers are extended:
- Check that all thrust levers are set to IDLE detent.
- Set both thrust reverser levers to MAX REV, and fully press the brake pedals.

L1 Note: If ground spoilers are not armed, ground spoilers extend at reverser thrust selection.
REVERSERS.....CHECK/ANNOUNCE PM
L2 - Check that the ECAM E/WD displays the expected reverser deployment (i.e. REV).
- If reverser(s) do not deploy as expected, one of the main deceleration means is lost. The flight crew should consider adapting the available deceleration means to stop the aircraft.
L1 DIRECTIONAL CONTROL.....MONITOR/ENSURE PF
L2 - Ensure directional control. Use the rudder pedals for directional control.
- During rollout, avoid sidestick inputs (either lateral or longitudinal)
- If the flight crew encounters directional control problems, they should reduce the thrust to REV IDLE until directional control is satisfactory.

L1 Do not use the nosewheel steering control handle before reaching taxi speed.

- **If autobrake is selected:**

AUTOBRAKE.....MONITOR PM
L2 During all the rollout, the PM monitors the blue light on the autobrake panel, and calls out if the autobrake mode disengages.
L1 Note: If no ground spoilers are extended, the autobrake will not activate.

If landing without autobrake:
BRAKES.....AS RQRD PF
L2 - Although the green hydraulic system supplies the braking system, if pedals are pressed rapidly, a brake pressure indication appears briefly on the BRAKE PRESS indicator.
- Braking may begin before the nosewheel has touched down, if required for performance reasons. However, when comfort is the priority, the flight crew should delay braking until the nosewheel has touched down.

L1 DECELERATION.....CHECK/ANNOUNCE PM

L2 The flight crew feels the deceleration. The flight crew checks the speed trend on the PFD to confirm the deceleration.

AT 70 KT
SEVENTY KNOTS.....ANNOUNCE PM
BOTH THRUST LEVERS.....REV IDLE PF
L2 It is recommended to reduce thrust when passing 70 kt. However, high levels of reverse thrust may be used in order to control aircraft speed in the case of an emergency.

L1

CAUTION	Avoid the use of high levels of reverse thrust at low airspeed, unless required due to an emergency. The distortion of the airflow, caused by gases re-entering the compressor, can cause engine stalls that may result in excessive EGT.

AT TAXI SPEED
REVERSERS.....STOW PF
L2 - When the aircraft reaches the taxi speed, and before it leaves the runway, stow the reversers.
- On snow-covered grounds, the reversers should be stowed when the aircraft speed reaches 25 kt.
- When deselecting the reversers, be careful not to apply forward thrust by moving the thrust levers beyond the FWD IDLE position.

L1

CAUTION	Except in an emergency, do not use the reverse thrust to control the aircraft speed while on taxiways.

L2 On taxiways, the use of reversers, even restricted to idle thrust, would have the following effects:
- The engines may ingest fine sand and debris that may be detrimental to the engines and airframe systems.
On snow–covered areas, snow will recirculate into the air inlet, and may cause an engine flameout or rollback.

BEFORE 20 KT

AUTO BRK.....DISENGAGE PF

L2 Disengage the autobrake to avoid some brake jerks at low speed.

The flight crew should use brake pedals to disengage the autobrake.

AUTOLAND

The following items must be performed in addition to previous Refer to PRO-NOR-SOP-AP PROACH USING LOC G/S.

AT 350 FT RA

LAND ON FMA.....CHECK/ANNOUNCE PF

ILS/GLS □ /MLS □ COURSE ON PFD.....CHECK PF

L2 If the ILS / GLS □ course pointer and the runway track differ by more than 5 °, perform a go-around, or a manual landing if visual references are sufficient.

AT 40 FT RA

FLARE ON FMA.....CHECK/ANNOUNCE PM

L2 If the FMA does not display FLARE, perform a go-around, or a manual landing if visual references are sufficient.

L1 FLARE.....MONITOR PF

AT 30 FT RA

THR IDLE ON FMA.....CHECK PM

THRUST IDLE.....CHECK PM

L2 Monitor thrust reduction.

AT 10 FT RA

L2 An automatic "RETARD" callout triggers.

L1 THRUST LEVERS.....IDLE PF

L2 The autothrust disconnects.

L1 LATERAL GUIDANCE.....MONITOR PF

L2 Monitor the lateral guidance by using external references.

AT TOUCHDOWN

Note: In the case of NWS or Anti-Skid failure, set the AP OFF at touchdown.

ROLL OUT ON FMA.....CHECK/ANNOUNCE PM

BOTH THRUST LEVERS.....REV MAX or REV IDLE PF

L2 The flight crew must select reverse thrust immediately after main landing gear touchdown.

The flight crew must immediately select REV MAX, if any of the following occurs at any time during the landing:

- An emergency
- The deceleration is not as expected
- A failure affects the landing performance
- A long flare or a long touchdown
- An unexpected tailwind.

A small pitch up may occur during thrust reversers deployment before nose landing gear touchdown. However, the auto-flight system will control this pitch up.

As soon as the flight crew selects reverse thrust, they must perform a full-stop landing.

L1 GND SPLRS.....CHECK/ANNOUNCE PM

L2 Check that the WHEEL SD page displays the ground spoilers extended after touchdown.

If no ground spoilers are extended:

- Check that all thrust levers are set to IDLE detent
- Set both thrust reverser levers to MAX REV, and fully press the brake pedals.

L1 Note: If ground spoilers are not armed, ground spoilers extend at reverser thrust selection.

REVERSERS.....CHECK/ANNOUNCE PM
L2 - Check that the ECAM E/WD displays the expected reverser deployment (i.e. REV)
- If reverser(s) do not deploy as expected, one of the main deceleration means is lost. The flight crew should consider adapting the available deceleration means to stop the aircraft.

L1 DIRECTIONAL CONTROL.....MONITOR/ENSURE PF

L2
- Monitor directional control, if the rollout is automatic
- Ensure directional control, if rollout is manual. Use rudder pedals for directional control.
- During rollout, avoid sidestick inputs (either lateral or longitudinal)
- If the flight crew encounters directional control problems, they should reduce the thrust to REV IDLE until directional control is satisfactory.

L1 Do not use the nosewheel steering control handle before reaching taxi speed.

 If autobrake is selected:

AUTOBRAKE.....MONITOR PM
L2 During all the rollout, the PM monitors the blue light on the autobrake panel, and calls out if the autobrake mode disengages.

L1 Note: If no ground spoilers are extended, the autobrake will not activate.
 If landing without autobrake:
BRAKES.....AS RQRD PF

L2- Although the green hydraulic system supplies the braking system, if pedals are pressed rapidly, a brake pressure indication appears briefly on the BRAKE PRESS indicator
- Braking may begin before the nosewheel has touched down, if required for performance reasons. However, when comfort is the priority, the flight crew should delay braking until the nosewheel has touched down.
L1 DECELERATION.....CHECK/ANNOUNCE PM
L2 The flight crew feels the deceleration. The flight crew checks the speed trend on the PFD to confirm the deceleration.

AT 70 KT
SEVENTY KNOTS.....ANNOUNCE PM
BOTH THRUST LEVERS.....REV IDLE PF
L2 It is better to reduce thrust when passing 70 kt. However, high levels of reverse thrust may be used in order to control aircraft speed in the case of an emergency.

L1

CAUTION	Avoid the use of high levels of reverse thrust at low airspeed, unless required due to an emergency. The distortion of the airflow, caused by gases re-entering the compressor, can cause engine stalls that may result in excessive EGT.

BEFORE 20 KT
AUTO BRK.....DISARM PF
L2 Disarm autobrake before 20 kt to avoid some brake jerks at low speed.
The flight crew should use brake pedals to disarm the autobrake.

END OF ROLL OUT
REVERSERS.....STOW PF

L2 - When the aircraft reaches the taxi speed, and before it leaves the runway, stow the reversers.
- On snow-covered grounds, the reversers should be stowed when the aircraft speed reaches 25 kt.
- When deselecting the reversers, be careful not to apply forward thrust by moving the thrust levers beyond the FWD IDLE position.
L1

CAUTION	Except in an emergency, do not use the reverse thrust to control the aircraft speed while on taxiways.

L2 On taxiways, the use of reversers, even restricted to idle thrust, would have the following effects:
- The engines may ingest fine sand and debris that may be detrimental to the engines and airframe systems.
- On snow–covered areas, snow will recirculate into the air inlet, and may cause an engine flameout or rollback.

L1 AP.....OFF PF
L2 Disengage the APs at the end of the roll out (before leaving the runway at the latest)

1.18.2 FLIGHT CREW OPERATING MANUAL AIRCRAFT SYSTEMS LANDING GEAR (NOSE WHEEL STEERING - CONTROLS AND INDICATORS) A318/A319/A320/A321

SIDE CONSOLES

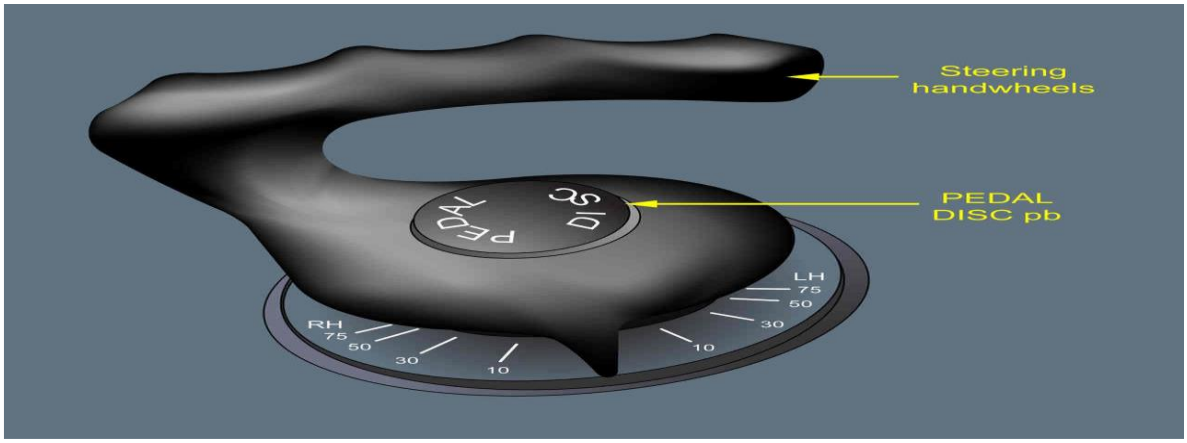

Figure 9: showing Side Consoles

STEERING HANDWHEELS
The steering handwheels, that are interconnected, can steer the nose wheel up to 75 ° in either direction.
Note: The steering system centers the nose wheel automatically after lift off.

RUDDER PEDAL DISC pb
Pressing this button on either handwheel removes control of nose wheel steering from the rudder pedals until the button is released.

WHEEL SD PAGE

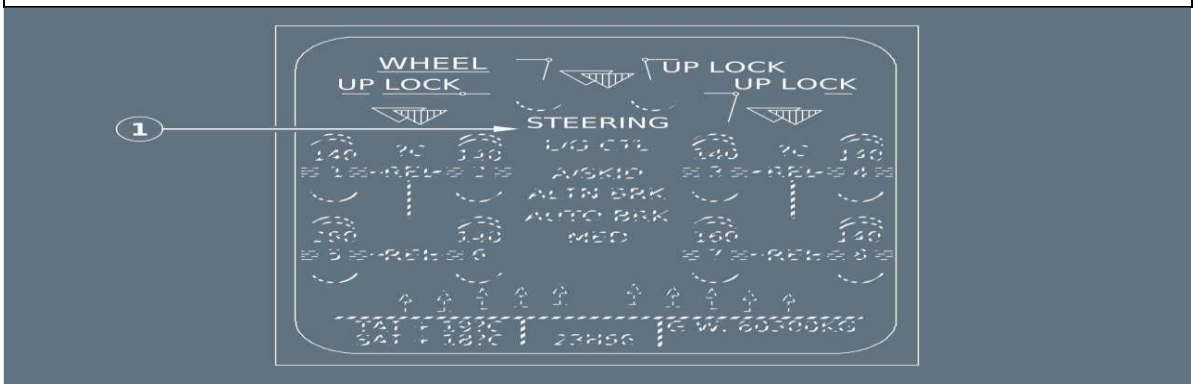

Figure 10: showing wheel SD controls and indicators

(1) STEERING indication
It appears along with an ECAM caution if either the nose wheel steering or the anti-skid feature fails.

MEMO DISPLAY

NW STRG DISC: This memo appears, when the nose wheel steering selector is in the towing position and with engines not running.
NW STRG DISC: This memo appears, when the nose wheel steering selector is in the towing position and if at least one engine is running.

GENERAL: LANDING GEAR BRAKES AND ANTISKID - DESCRIPTION

The main wheels are equipped with carbon multidisc brakes, which can be actuated by either of two independent brake systems.

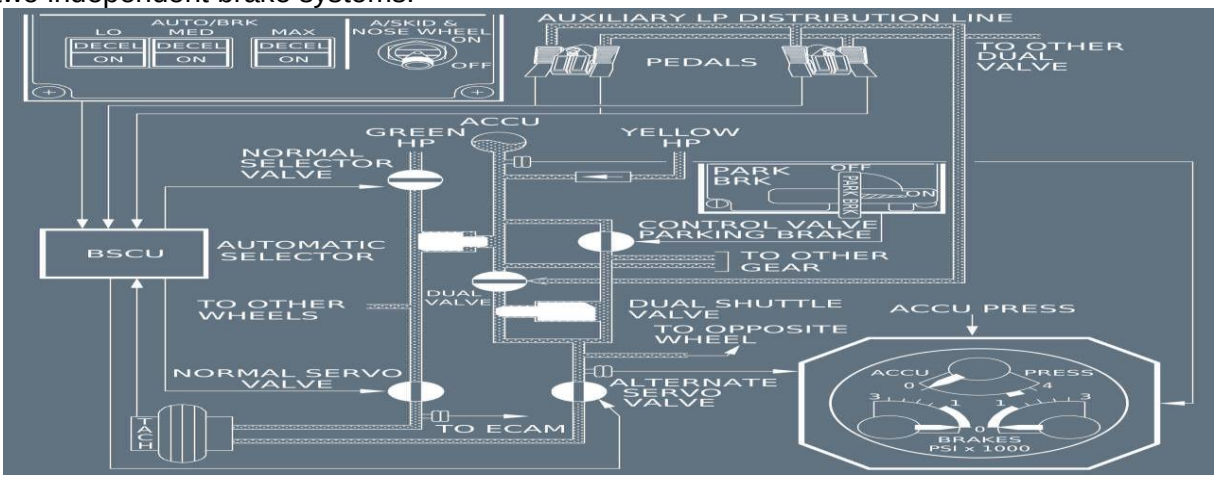

Figure 11: showing braking schematic system for brakes and antiskid.

The normal system uses green hydraulic pressure, whereas the alternate system uses the yellow hydraulic system backed up by the hydraulic accumulator.

An anti-skid and autobrake system is also provided.

Braking commands come from either the brake pedals (pilot action), or the autobrake system (deceleration rate selected by the crew).

Two units on each main gear monitor the temperature of the brakes.
All braking functions (normal and alternate braking control, anti-skid control, autobraking, brake temperature indication) are controlled by a two-channel Brake and Steering Control Unit (BSCU).

The main gear wheels are fitted with fusible plugs which protect against tire burst, in the event of overheat.
Main gear wheels are also equipped with brake cooling fans, which permit a high speed cooling of brakes.

ANTI-SKID SYSTEM

The antiskid system provides maximum braking efficiency by maintaining the wheels at the limit of an impending skid.
At skid onset, brake release orders are sent to the normal and alternate servo valves, as well as to the ECAM system which displays the released brakes.
Without using autobrake, full braking performance is achieved only with brake pedals at full deflection.
The antiskid system is deactivated below 20 kt (ground speed).
An ON/OFF switch activates, or deactivates, the antiskid and nosewheel steering systems.

PRINCIPLE
The speed of each main gear wheel (given by a tachometer) is compared to the aircraft speed (reference speed). When the speed of a wheel decreases below approximately 0.87 times (depending on conditions) reference speed, brake release orders are given to maintain the wheel slip at that value (best braking efficiency).
In normal operation, the reference speed is determined by the BSCU from the horizontal acceleration of ADIRU 1, or ADIRU 2, or ADIRU 3.

In case all ADIRUs fail, reference speed equals the maximum of either main landing gear wheel speeds.

AUTO BRAKE

GENERAL
The purposes of the autobrake system are the following:
- Reduce the braking distance in case of an aborted takeoff
- Establish and maintain a selected deceleration rate during landing, thereby improving passenger comfort and reducing crew workload.

SYSTEM ARMING
The crew may arm the system by pressing the LO, MED, or MAX pushbutton provided all the following arming conditions are met:
- Green pressure available
- Anti-skid electrically-powered
- No failure in the braking system
- At least one ADIRU is available.

Note: 1. Auto brake may be armed with the parking brake on.
2. MAX autobrake mode cannot be armed in flight.

SYSTEM ACTIVATION
Automatic braking is activated when:
- The command for ground spoilers extension is detected (Refer to DSC-27-10-20 Speed Brakes and Ground Spoilers - Speed Brake Control), for LO and MED mode, or
- The command for ground spoilers extension is detected, and the wheel speed is above 40 kt, for MAX mode.

Therefore, if the aircraft makes an acceleration stop and begins to decelerate when the wheel speed is under 72 kt, the automatic braking will not activate because the ground spoilers will not extend.
For autobrake to activate, at least two SEC's must be operative.

SYSTEM DEACTIVATION
The system deactivates when:

- The system disarmed (Refer to DSC-32-30-10 Auto Brake - System Disarming), or
- The ground spoilers retract. In this case it remains armed.

SYSTEM DISARMING

The system disarms when:
- Flight crew presses the pushbutton switch, or
- One or more arming conditions is lost, or
- After take-off/touch and go, or
- Flight crew applies enough deflection to at least one brake pedal when autobrake is active in MAX, MED or LO mode.

GENERAL

There are four modes of operation:
- Normal braking
- Alternate braking with antiskid
- Alternate braking without antiskid
- Parking brake.

NORMAL BRAKING

Normal braking is operative when:
- Green hydraulic pressure is available
- A/SKID & N/W STRG switch is ON.

During normal braking, antiskid is operative and autobrake is available.

Braking is electrically-controlled through the BSCU from:
- Pilot's pedals, or
- Automatically activates when:
• On ground by the autobrake system, or
• In flight when the landing gear lever is up.

The antiskid system is controlled by the BSCU via the normal servo valves.
There is no brake pressure indication in the cockpit.

ALTERNATE BRAKING WITH ANTI-SKID

Autobrake is inoperative.
Braking uses this mode when green hydraulic pressure is insufficient, and:
- Yellow hydraulic pressure is available
- A/SKID & N/W STRG switch is ON
- Parking brake is not ON.

An automatic hydraulic selector changes from the green to the yellow system.
The pedals brake through the auxiliary low-pressure hydraulic distribution line acting on the dual valves. The BSCU controls the anti-skid system via the alternate servo valves.
A triple indicator on the center instrument panel indicates the pressure delivered to the left and right brakes, as well as the accumulator pressure.
Note: Initial pedal force or displacement produces more braking action in alternate mode than in normal mode.

ALTERNATE BRAKING WITHOUT ANTI-SKID

Autobrake is inoperative.
The anti-skid system can be deactivated:
- Electrically (A/SKID & N/W STRG sw OFF, or power failure or BSCU failure), or
- Hydraulically (low pressure in both green and yellow systems, brakes being supplied by the brake accumulator only).

The pilot controls the braking with the pedals (acting on the dual valves).
Alternate servo valves are fully open.
Brake pressure and accumulator pressure are indicated on a triple indicator, located on the center instrument panel. The pilot must modulate brake pressure at, or below, 1 000 PSI in order to avoid wheel locking.

The accumulator can supply at least 7 full brake applications.
Note: Initial pedal force or displacement produces more braking action in alternate mode than in normal mode.

PARKING BRAKE
Brakes are supplied by the yellow hydraulic system, or by accumulator via the dual shuttle valves.
Alternate servo valves open allowing full pressure application.
The accumulator maintains the parking pressure for at least 12 h.
If the parking brake is activated and no yellow hydraulic or accumulator brake pressure is available, then the normal braking system can be applied via the brake pedals.
Yellow accumulators can be pressurized by pressing the yellow electrical pump switch.
A triple indicator on the center instrument panel indicates the pressure delivered to the left and right brakes, as well as the accumulator pressure.

AIRCRAFT SYSTEMS LANDING GEAR BRAKES AND ANTISKID - CONTROLS AND INDICATORS

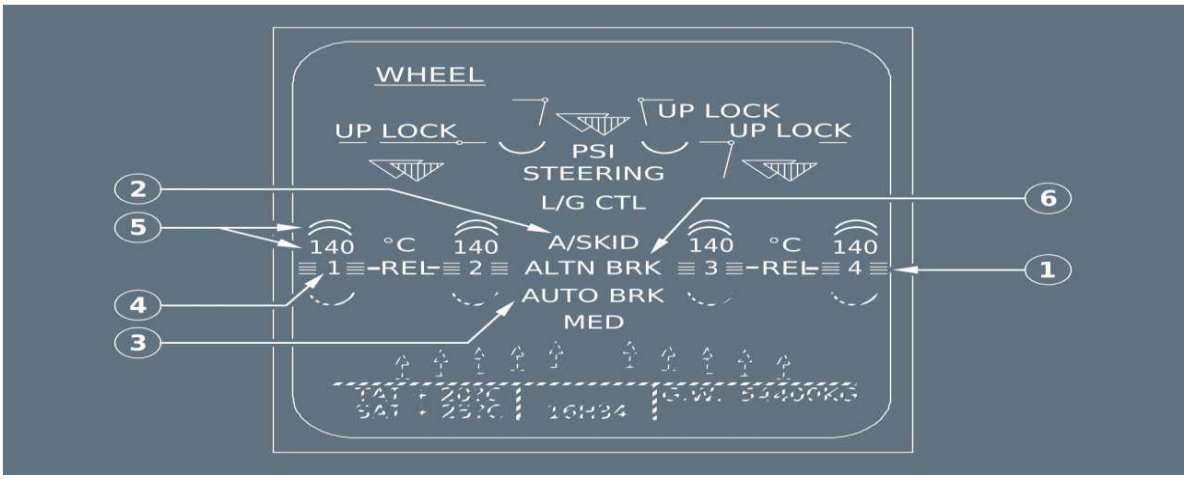

Figure **12**: shows aircraft systems landing gear brakes and antiskid - controls and indicators.

(1) Release indicators
These green lines appear temporarily after the landing gear has been lowered to indicate that the anti-skid function is ready.
They reappear after touchdown, along with REL (blue), when the anti-skid is active.
(2) A/SKID
This legend appears in amber, along with an ECAM caution, in case of total BSCU failure, or when the A/SKID & N/W STRG sw is OFF, or if the BSCU detects an ANTI-SKID failure.
(3) AUTO BRK
This legend appears:
- In green when auto brake is armed, or
- Flashing green for 10 s after autobrake disengagement, or
- In amber, along with an ECAM caution, to indicate a system failure.

MED, LO, or MAX appears underneath in green to show which rate has been selected.
(4) Wheel number
This white number identifies individual wheels of the main landing gear.

(5) Brake temperature
- Temperature normally appears in green.
- Green arc appears on the hottest wheel when one brake temperature exceeds 100 °C.
- Green arc becomes amber, and an ECAM caution appears, when the corresponding brake temperature exceeds 300 °C.

(6) ALTN BRK
This legend appears in green if the braking system is in alternate mode.

MEMO DISPLAY

AUTO BRK LO/MED/MAX: This memo appears in green, depending on the selection of the AUTO BRK pb.
AUTO BRK OFF: This memo appears in green if the auto brake is failed.
BRK FAN: This memo appears in green if the BRK FAN pb □ is ON.
PARK BRK: This memo appears in green, if the parking brake is ON, during flight phases 1, 2, 9 and 10.

ECAM System (YB-BAE QRH) System malfunction or ECAM Alert (Affected System)- Reset Procedure:
Landing Gear- L/G LGCIU 1(2) FAULT (LGCIU 1(2))

On ground only:
The flight crew must depressurize the green hydraulic system before resetting the LGCIU:
- ENG 1 PUMP OFF
- PTU OFF.
When there is no green hydraulic pressure:
- To reset LGCIU 1:
• Pull C/B Q34 on 121VU, then C09 on 49VU, then R32 on 121VU.
• Wait for 15 s, then push the C/Bs.
- To reset LGCIU 2:
• Pull C/B Q35 on 121VU, then R33 on 121VU.
• Wait for 15 s, then push the C/Bs.

After the LGCIU reset, restore green hydraulic pressure (ENG 1 PUMP ON, PTU AUTO).

WHEEL- WHEEL N.W STEER FAULT or WHEEL N/W STRG FAULT (BSCU)
On ground only:
Case A
If the three conditions below are fulfilled:
- the WHEEL N/W STRG FAULT alert was triggered just after engine start
- the N/W STRG DISC memo was displayed before the start of the pushback (before the aircraft starts moving)
- the N/W STRG DISC memo remained displayed even after the pushback is finished (nosewheel steering selector bypass pin is in the steering position).
Apply the below reset procedure.
If the ECAM alert disappears after the reset, the flight crew may continue the flight without troubleshooting.

Case B
In all other cases, including in case of doubt on the above conditions, troubleshooting must be performed before continuing the flight, even if the ECAM alert disappears after the reset. For a return to the gate:
- Apply the below reset procedure
- The taxi speed must not exceed 10 kt.
Reset Procedure:
- STOP aircraft
- Set PARK BRK handle to ON
- Confirm that towing bar is disconnected
- Set A/SKID & N/W STRG sw to OFF
- Set A/SKID & N/W STRG sw to ON.

Note: After any BSCU reset:
1. Check brake efficiency
2. Check absence of aircraft veering
3. Record the BSCU reset in the logbook.

2.1. **Useful or Effective Investigation Techniques**

2.1.1. None.

2. ANALYSIS

2.1 General:

From the available evidence, the following analysis were made with respect to this serious incident. This shall not be read as apportioning blame or liability to any organization or individual.

2.1.1 The aircraft SAW781 is owned and operated by the Cham Wing the operator is properly licensed by Civil Aviation Authority (CAA). The OTSB investigation team noted that the Operator (Airline) and the Service Provider (DGAN) have implemented Safety Management System (SMS), whereby occurrences are reported to the relevant authorities as and when they occur and they are reviewed, categorized, classified and investigated to identify the need for any remedial action that are required to be taken by the organization. The SMS system also covers the just culture which encourages the reporting of occurrences and errors. The operator has landing and aircraft system malfunction or ECAM Alert procedures in place and were executed efficiently following the system malfunction or ECAM Alert regarding the LGCIU and NWS faults after landing and before the aircraft veered off to the left of the RWY. The flight crew reported to the TWR ATCO that the aircraft had no issues until after the TWR ATCO requested OA-OPS3 operations to conduct the RWY inspection during which they confirmed that the aircraft was stopped outside the RWY edge white line marking which confirmed the serious incident. There were no anomalies identified with the reporting of the incident by the flight crew. OTSB investigation team concluded that there was no organizational factor with regards to the reporting and confirming of occurrences. This was not a factor into the serious incident however the flight crew should have provided the TWR ATCO with the correct information which could have given the TWR ATCO options to coordinate and handle the serious incident.

2.1.2 Non-reporting of incidents and not providing accurate information to the ATCO can lead to potential hazards and risks on the RWY to other traffic using RWY08L, to reduce hazards and mitigate and manage residual risk in air transportation. RWY operations are an integral part of aviation; the hazards and risks associated with RWY operations need to be managed in order to prevent RWY incidents that may lead to accidents. For occurrences to be effectively managed the flight crew need to report accurate information to the ATCO. The flight crew could not verify the extend of the damages sustained on the main wheel tires until the aircraft came to a stop at its allocated. The RWY inspection was conducted and cleared of FOD by OA-OPS3. The ATCO should be complimented for handling this serious incident professionally by halting the two aircraft that were ready for take off, requesting the OA-OPS3 to conduct the RWY inspections and to also confirm if the position of the aircraft where the flight crew had stopped.

2.1.3 The communications between the flight crew and the ATCO was clear and both the ATCO and the flight crew were able to confirm and verify the clearances and instructions, therefore communication was not a factor to the serious incident.

2.2 Flight operations

2.2.1 Flight crew Qualifications:

2.2.1.1 The flight crew were properly licensed to operate the aircraft and their medical records didn't show any limitations or restrictions. At the time of the incident, both flight crew medical certificates were valid for the flights conducted. There was no issue with regard to the rest period of both flight crew, the flight crew were well rested prior to undertaking the operation of the incident flight.

2.2.2 Operational procedures:

2.2.2.1 The Capt of aircraft SAW781stated that the departure flight from OSDI was normal. The take-off, cruise and approach were normal with good weather. The touchdown and landing on OOMS RWY 08L were smooth and normal however, during the deceleration at the speed of approximately 49 knots, the flight crew observed on ECAM the LGCIU 1 fault and NWS fault indications. The aircraft then started veering to the left of the center line of RWY 08L.

2.2.2.2 The flight crew followed established procedures when they received observed on ECAM the LGCIU 1 fault and NWS fault indications, there was no deviation from laid down procedures for landing and braking. OTSB investigation team concluded that the flight crew's operation was not a factor to the incident as the crew followed the procedures during the serious incident flight. The landing and braking procedures were followed by flight crew and complied with as per the QRH to avoid any possibility of collision or an accident.

2.2.2.3 The Capt took control of the aircraft from the FO in an attempt to compensate the drift by using the rudder pedals with no success even after trying the normal braking there was still no rudder authority possible or most likely due to lack of brake pressure and accumulator pressure. The Capt then opted to revert back to alternate braking by requesting the FO to set NWS switch to off position. This is the cause of the autobrake was not disarmed by the flight crew and the aircraft speed was less than 20 KNT, resulting on the brake jerks as the mainwheel were bound and holding as evidenced on the RWY by the mainwheel tire marks. The aircraft SAW781 stopped just outside the left edge white line marking of RWY 08L, parking brake was applied and NWS switch was reset as per the QRH. After the resetting of NWS, the system was normal, the flight crew taxied the aircraft to vacate the RWY via taxiway Y6 to their allocated gate.

2.2.2.4 The FO officer stated that following the ECAM messages on LGCIU and NWS, the crew tried to use the rudder but the effect was very minimum and the aircraft was drifting to the left with force and the normal braking was not working effectively. However, after using the alternate brake system the aircraft SAW781 stopped on the RWY. After resetting the NWS the system was normal and the flight crew continued taxing the aircraft to the allocated gate. After arriving at the gate, the crew of aircraft SAW781 called the maintenance team to check the aircraft SAW781.

2.2.2.5 According to the aircraft Flight Data Management (FDM) recording the aircraft touched down at the time 22:39:53 at a heading of 083° in RWY 08L. At the time 22:40:43 and aircraft speed was 49 KTS, the crew lost rudder authority and the aircraft started veering off to the left of RWY 08L center line. Then the aircraft came to a complete stop at the time 22:41:00 on a heading 065° which is 18° to the left of RWY 08L center line. According to the flight crew operating manual the Automatic braking is activated when the command for ground spoiler's extension is detected, and the wheel speed is above 40 KTS, for MAX mode. Therefore, if the aircraft makes an acceleration stop and begins to decelerate when the wheel speed is under 72 KTS, the automatic braking will not activate because the ground spoilers will not extend. Further to the above the antiskid system was deactivated as the ground speed was below 20 KTS.

2.2.2.6 OTSB determined that the RE occurred as a result of uncommanded nosewheel steering following LGCIU 1 and NWS faults indications on the ECAM during deceleration resulting on the aircraft veering off to the left of RWY 08L during which the mainwheel tires sustained substantial damages. The aircraft stopped on the left-hand side of the RWY edge with the left main wheels outside the RWY 08L. The cause of the loss of the nose wheel steering could not be determined.

2.2.3 Weather:

2.2.3.1 The flight crew did not observe any cloud on the weather radar system, and or any deviation from flight plan. The weather was good and clear (VMC). No significant weather was observed during the time of the serious incident and the wind was almost calm. Weather was considered to be normal at the time of the serious incident and none of the flight crew reported severe

weather or challenges with en-route including the approach and landing weather, as a result, the OTSB investigation team concluded that weather was not a factor into the serious incident.

2.2.4 Air Traffic Control:

2.2.4.1 The TWR ATCO held valid license with Class 3 medical certificate at the time of the incident. TWR ATCO provided pertinent information to the flight crew in relation to the flight and the track. The TWR ATCO exercised the privileges of his ATCO license as required by CAR.ATCO.A.015 which states that, “the exercise of the privileges granted by a license shall be dependent on the validity of the license, ratings, endorsements including English Language Proficiency (ELP) and the medical certificate.”

2.2.5 Communications:

2.2.5.1 The communications between the flight crew and the APP ATCO was clear with the correct phraseology by both the ATCO and the flight crew including providing information to the TWR ATCO by the flight crew. The ATCO should be complimented for efficient coordination and communications with the flight crew of the incident aircraft and other two aircraft which were halting for taking off until the serious incident aircraft was cleared from the runway and after the runway inspection. Therefore, OTSB investigation team determined that there were no communication issues which contributed to the serious incident.

2.2.6 Aids to Navigation:

2.2.6.1 The navigational system onboard aircraft SAW781 was found to be serviceable and operated as required at the time of the incident. Therefore, OTSB investigation team determined that the navigational aid was not a factor to the serious incident.

2.2.7 Aerodrome:

2.2.7.1 The serious incident happened after landing during decelerating. There were no reported defects on the RWY and post RWY inspection found no FOD on the RWY that could have contributed to the serious incident, therefore, OTSB investigation team determined that the aerodrome was not a factor to the serious incident.

2.3 Aircraft:

2.3.1 The aircraft SAW781 was issued with valid certificate of airworthiness (CoA) and certificate of registration (CoR), the maintenance records of the aircraft did not reveal any abnormality in the maintenance standard requirements. The aircraft was certified and maintained in accordance with existing regulations and approved procedures. There was no pre-existing defects or conditions that contributed to the occurrence.

2.3.2 The review of the operator’s Minimum Equipment List (MEL), identified some of the operational and maintenance related defects which were still not resolved at the time of the serious incident.

2.3.3 According to the maintenance records there were similar faults observed previously which resulted in the replacement of the BSCU and LGCIU units and at times some faults were cleared by both the flight crew and the AME.

2.3.4 A system reset is the action of switching off a system and then switching it back on again with the objective to retrieve normal system behavior or recover a previously lost function.

2.3.5 BSCU and LGCIU Systems are interconnected, therefore, a system reset of one system can have significant consequences for the other systems that rely on its data. It is therefore, important that maintenance personnel and flight crew only perform system resets in accordance with the guidance in the relevant manufacturers procedures.

2.3.6 From the maintenance records, proper diagnosis of the root causes was not completed or done which led to the deteriorating condition of the braking systems.

2.4 Human Factors:

2.4.1 The flight crew reported that after landing during deceleration following appearance of both LGCIU and NWS on ECAM, the flight crew attempted using the rudder pedals to control the aircraft but it was too slow and the normal brakes also did not work. The crew reported that they used the alternate brakes and the aircraft SAW781 stopped safe on the RWY. The flight crew further reported that the system was reset as per the aircraft QRH and everything was back to normal hence the flight crew continued taxiing to the allocated gate, where the maintenance team conducted further inspection, changed the wheels and reset the system. Therefore, OTSB investigation team determined that there were no human factors related issues which contributed to the serious incident.

2.5 Survivability:

2.5.1 Rescue fire service response: Although OA operations conducted the RWY inspections following the incident, there were no Rescue and Fire services required, therefore Rescue and Fire was not a factor to the serious incident as there was no fire during and after the incident. However, the RWY inspection conducted was crucial to ensure that there was no FOD and the RWY is cleared for normal operation.

3. CONCLUSION

3.1. **General**

From the available evidence, the following findings, causes and contributing factors were made with respect to this serious incident. These shall not be read as apportioning blame or liability to any organization or individual.

To serve the objective of this investigation, the following sections are included in the conclusion heading:

- **Findings —** are statements of all significant conditions, events, or circumstances in this incident. The findings are significant steps in this incident sequence, but they are not always causal or indicate deficiencies.

3.2. **Findings**

3.2.1 The flight crew were properly licensed to conduct the flight. Their licenses were valid and issued by Syria CAA.

3.2.2 Aircraft SAW781 was properly registered and issued with Certificate of Airworthiness and Certificate of Registration by Syria CAA and was valid at the time of the incident.

3.2.3 The TWR ATCO was issued with Air Traffic Controller license by Oman CAA on the 21st December 2011 and a proficiency check was conducted on the 18th Feb 2024 with an expiry date of the 31st December 2026.

3.2.4 Both AMEs were properly licensed to conduct the maintenance on the aircraft. Their licenses were valid and issued by Syria CAA and Sultanate of Oman CAA respectively.

3.2.5 There was no evidence that incapacitation or physiological factors affected the flight crew, ATCO and both AMEs performance. There was no evidence that the flight crew suffered any sudden illness or incapacity which might have affected both of the aircraft crews' ability to control the aircraft.

3.2.6 The flight crew reported that after landing during deceleration following appearance of both LGCIU and NWS on ECAM, the flight crew attempted using the rudder pedals to control the aircraft but it was too slow and the normal brakes also did not work.

3.2.7 RWY 08L was closed due to OA operations conducting RWY inspection following the serious incident.

3.2.8 OMA281 and IGO1274 were held for more than 10 minutes for departure while OA operations were conducting the RWY inspections.

3.2.9 The Capt of aircraft SAW781 stated during the interview that during the deceleration the flight crew observed on ECAM the LGCIU 1 fault and NWS fault warning/indications.

3.2.10 The flight crew reported that the aircraft started drifting to the left of the center line of RWY 08L.

3.2.11 The flight crew reported to TWR ATCO a loss of nose wheel steering and that the aircraft had veered off from the centerline of RWY 08L, but the flight crew did not report that the aircraft veered off the RWY centerline and stopped at the left edge of RWY 08.

3.2.12 The flight crew reported uncommanded NWS however the aircraft had no other issues until after the AO-OPS3 conducted the RWY inspection which confirmed the incident and also that the aircraft was outside the RWY edge.

3.2.13 The aircraft SAW781 stopped just outside the left edge white line marking of RWY 08L, parking brake was applied and NWS switch was reset as per the QRH before being taxied to vacate the RWY via taxiway Y6 to their allocated gate.

3.2.14 The review of the operator's MEL identified some of the operational and maintenance related defects which at the time of the incident they were still not resolved.

3.2.15 The following: LAF, ACCFAULT Flight Control (F/CTL), Brake fan system partially available "FAN 1 and 2 deactivated, ENG#2 Thrust Reverser deactivated and ENG#1 IGN fault were recorded defects reports on MEL which were still open at the time and date of the serious incident.

3.2.16 According to the maintenance records history of aircraft SAW781, the LGCIUs were replaced 4 times between 30th April 2024 and 02nd August 2024. The 3rd time it was replaced was 09th July 2024 few days prior to the serious incident.

3.2.17 The LGCIU 1 data was requested by the OTSB however it was not shared by the state of registry. According to the maintenance records the LGCIU 1 calculator was not replaced following the serious incident.

3.2.18 According to the maintenance records history of aircraft SAW781, the BSCU was replaced 3 times between 13th January 2024 and 30th April 2024.

3.2.19 Ref 31967: 18th July 2024, OSDI - OOMS incident flight, aircraft was declared serviceable after the number 1,2 and 4 main wheels tires which worn-out tires were replaced.

3.2.20 Ref 31968: 19th July 2024, OOMS - OSDI, aircraft was declared serviceable after the worn-out tires for the number 1 and 2 nose wheels tires and the proximity sensor replaced. The nose wheel tires were replaced due to being worn out.

3.2.21 Ref 31969: 21st July 2024 daily pre-flight check at OSDI, same faults as on 18th July 2024 in OOMS appeared and nose wheel tires were replaced due to flat spot. The standby main wheel which was in the cargo from OOMS was also changed. Functional tests conducted successfully.

3.2.22 Ref 31997: 27th July 2024, Sharjah International Airport (OMSJ)-OSDI after lowering the landing gear the crew reported unknown vibrations. The aircraft veered to the left after landing even without using the thrust reversers. LGCIU #2 fault message appeared.

3.3. **Cause**

3.3.1 OTSB determined that the RWY Excursion occurred as a result of uncommanded NWS following LGCIU 1 and NWS faults and indications on the ECAM and ineffective rudder inputs, during the landing deceleration resulting on the aircraft veering off to the left edge white line marking of RWY 08L. The aircraft left main wheels stopped outside the white line marking of RWY 08L, edge. The cause of the loss of the NWS could not be determined.

3.4. **Contributing Factors**

3.4.1 Antiskid jerking before and after the aircraft was stopped.

3.4.2 The LGCIU 1 fault and NWS fault

3.4.3 Intermittent failure of the BSCU resulting in LGCIU and NWS failure.

4. SAFETY RECOMMENDATIONS

4.1. **General**

The safety recommendations listed in this report are proposed according to paragraph 6.8 of Annex 13 to the Convention on International Civil Aviation and are based on the conclusions listed in heading 3 of this report. The OTSB expects that all safety issues identified by the investigation are addressed to the receiving States and organizations/entities.

4.2. **Safety Recommendations**

4.2.1 **Cham Wings Airlines:**

4.2.1.1 The Cham Wings Airline is recommended to approach the aircraft manufacturer regarding the in-service difficulty reporting of intermitted failure of BSCU, LGCIU and NWS. These components were replaced several times prior to the incident however the LGCIU and NWS faults reappeared resulting in the RWY excursion.

5. APPENDICES

5.1 Not applicable.

This report is issued by:
Oman Transport Safety Bureau (OTSB)
Sultanate of Oman