الهيئة العامة للطيران المدني
GENERAL CIVIL AVIATION AUTHORITY

United Arab Emirates

Air Accident Investigation Sector

Accident

- Final Report -

AAIS Case N^{o} AIFN/0020/2014

Loss of Control-Inflight

Operator	Falcon Aviation Services
Make and Model	AgustaWestland AW 109SP
Nationality and Registration	United Arab Emirates, A6-FLP
Place of Occurrence	Emirates Palace Hotel Heliport
State of Occurrence	United Arab Emirates
Date and Time (LT)	15 December 2014, 1845

Air Accident Investigation Sector
General Civil Aviation Authority
The United Arab Emirates

Accident Brief

AAI Report Number	AIFN/0020/2014
Occurrence Classification	Accident
Occurrence Categorization	Loss of Control-Inflight
Operator	Falcon Aviation Services
Aircraft Type and Registration	AgustaWestland AW109SP
MSN	22240
No and Type of Engines	Two - Pratt and Whitney Canada PW207C
Location	Emirates Palace Hotel Heliport
Date and Time (LT)	15 December 2014, 1845
Type of Flight	Commercial (Air Transport)
Persons On-board	Nine
Injuries	NIL

Investigation Objective

This Investigation is performed pursuant to the United Arab Emirates *Federal Act No. 20 of 1991*, promulgating the *Civil Aviation Law*, Chapter VII – *Aircraft Accidents*, Article 4. It is in compliance with the *Civil Aviation Regulations*, Part VI, Chapter 3, in conformity with *Annex 13 to the Convention on International Civil Aviation*, and in adherence to the *Air Accidents and Incidents Investigation Manual*.

The sole objective of this Investigation is to prevent aircraft accidents and incidents. It is NOT the purpose of this activity to apportion blame or liability.

Investigation Process

The Accident was notified to the Air Accident Duty Investigator on 15 December 2014 at about 1800 LT. An Investigation Team was immediately dispatched to the accident site.

The Air Accident Investigation Sector (AAIS) of the United Arab Emirates conducted the investigation, as of being the investigation authority of the State of Occurrence.

Notes:

[1] Whenever the following words are mentioned in this Report with the first letter Capitalised, it shall mean:

(Aircraft). The aircraft involved in this accident

(Investigation). The investigation into this accident

(Accident). This investigated accident

(Captain). The captain of the accident aircraft

(Co-pilot). The co-pilot of the accident aircraft

(Report). This accident Final Report.

2 Unless otherwise mentioned, all times in this Report are Local Time (LT) of the United Arab Emirates (Coordinated Universal Time (UTC) plus 4 hours).

3 Photos used in this Report are taken from different sources and are adjusted from the original for the sole purpose to improve 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.

Abbreviations

AAIS	The Air Accident Investigation Sector of the United Arab Emirates
CAAP	*Civil Aviation Advisory Publication*
CAR	*Civil Aviation Regulations* of the United Arb Emirates
CAVOK	Ceiling and Visibility OK
ELT	Emergency locator transmitter
FAS	Falcon Aviation Services
GCAA	The General Civil Aviation Authority of the United Arab Emirates
HLO	Heliport landing officer
kg	kilogram
LT	Local time of the United Arab Emirates
MCC	Abu Dhabi Search and Rescue Mission Coordination Center
SP	Safety Pilot
SR	Safety recommendation
VIP	Very important person

Synopsis

On 15 December 2014, an AgustaWestland AW109SP helicopter, serial number 22240, registration A6-FLP, owned by Falcon Aviation Services (FAS) was scheduled to operate a VIP flight from Emirates Palace Hotel, Abu Dhabi, to Al Marmum Farm, the United Arab Emirates.

At the time that the flight reservation was made, no information was provided to FAS regarding the names, number, or weight of the passengers. Later on, information that the Aircraft would be occupied with six passengers was available to the flight crew.

The boarding of the passengers was conducted by the VIP security personnel and was not supervised by the flight crew during which, The Safety Pilot (SP) was prevented from observing the passenger cabin.

As the Aircraft hovered over the sloping ground, there was an over-torque warning and the Captain lowered the collective slightly, followed by increasing power by the Captain. Another over-torque warning was noticed and the rotor speed was rapidly decreasing. The Aircraft descended rapidly and impacted a road running between the two final approach and take-off areas (FATO), beyond the sloping ground.

The Air Accident Investigation Sector determines cause of the Accident was the attempted takeoff at an Aircraft weight which exceeded the approved maximum take-off weight (MTOW).

Four safety recommendations are included in this Final Report, which are addressed to the operator and to the General Civil Authority of the United Arab Emirates.

Table of Contents

List of tables:

List of figures:

1. Factual Information

1.1 History of the Flight

On 15 December 2014, an AgustaWestland AW109SP helicopter, serial number 22240, registration A6-FLP, owned by Falcon Aviation Services (FAS) was scheduled to operate a VIP flight from Emirates Palace Hotel, Abu Dhabi, to Al Marmum Farm, the United Arab Emirates.

The FAS Sales Department received a phone call at 1613 LT to book a flight which would depart Emirates Palace Hotel at 1715 for Al Marmum Farm. The reservation was confirmed at approximately 1658 LT. The departure time was changed to 1730 LT as the Aircraft was in transit from Al Bateen Palace to Emirates Palace Hotel.

At the time that the flight reservation was made, no information was provided to FAS regarding the names, number, or weight of the passengers. Later on, information that the Aircraft would be occupied with six passengers was communicated to the flight crew by the FAS Flight Operations Department.

As there was no AW109SP pilot on-duty, the FAS Flight Operations Department contacted the Captain, who was on his day off. The Captain agreed to operate the flight and he was within the company's approved duty time limitations.

Although the AW109SP is a single pilot helicopter, FAS routinely rosters a Safety Pilot (SP) for night operations. The SP was originally scheduled for another flight but, she was on duty and available to act as SP for the Accident flight. As the passengers arrived at the heliport late, the Aircraft took off at 1832 instead of 1730 LT. There were two crewmembers and seven passengers on-board.

1.1.1 Routing of the flight

The Aircraft was located at Al-Bateen Palace where it was fueled and handed over to the operating crew who signed the loadsheet showing a take-off weight of 2910 kg including a fuel weight of 440 kg. The Aircraft departed for the short ferry flight to the Emirates Palace Hotel Heliport. On arrival, the fuel on-board was 430 kg.

As the flight routing included a landing in Dubai prior to flying to the ultimate destination of Al Marmum Farm, and the flight crew were only provided with coordinates for the landing in Dubai, the flight was to be conducted in formation with another helicopter, an AgustaWestland AW139, operated by a different company (Liwa). This helicopter occupied the second heliport pad at the Emirates Palace Hotel, next to the Accident Aircraft. While waiting for the passengers to arrive, a briefing took place between the two helicopter crewmembers regarding the flight to the Dubai destination.

1.1.2 Passenger arrival and boarding

At 1830 LT, approximately 12 vehicles arrived at the heliport with the passengers and a number of security personnel, who approached the two helicopters. The SP remained outside the Aircraft with the intention of supervising the boarding of the passengers, providing a safety briefing, and ensuring that the passengers were secured in their seats.

The boarding of the passengers was conducted by their security personnel and was not supervised by the flight crew. The SP was prevented from observing the passenger cabin. Neither the loadsheet for passenger weights, nor the total number of passengers was available to the crew. In addition, a number of security personnel had approached the Aircraft while the rotor was turning.

The SP was distracted as she tried to ensure that the security personnel did not approach the tail rotor, and she was obstructed by security personnel who appeared to be determined to keep anyone, including the flight crew, away from the VIP passengers.

The SP was prevented, by security staff, from looking inside the passenger cabin. The cabin was fitted with two three-seat benches. The SP confirmed that there were seven passengers on-board the Aircraft. It was not possible, due to the activities of the security personnel, to provide a safety briefing, or to confirm that the passengers were secured, prior to takeoff.

The escorting Liwa AW139 departed and requested the Accident Aircraft to join so that the formation flight could be commenced.

The SP was seated in the left seat on the flight deck and she informed the Captain that there were seven passengers on-board. The Captain acknowledged the information and initiated the takeoff immediately without briefing the SP.

1.1.3 Takeoff from the heliport

As the Aircraft started to hover, the autopilot disengaged and the Captain instructed the SP to re-engage it. The autopilot was successfully re-engaged, but the Captain noticed that the torque was rising above 92%. The Captain mentioned to the SP that the Aircraft was heavy and the SP continued to call out the engine torque readings.

The Aircraft was now clear of the tree line around the heliport, and the Captain elected to turn into the wind and hover taxi over the sloping ground to the adjacent heliport pad.

As the Aircraft hovered over the sloping ground, there was an over-torque warning and the Captain lowered the collective slightly. However, since the warning was brief, the Captain commenced increasing power. Both pilots commented that the Aircraft did not seem to be climbing.

The Captain then heard another over-torque warning and noticed that the rotor speed was rapidly decreasing.

1.1.4 Loss of height and ground impact

The Aircraft descended rapidly and impacted a road running between the two final approach and take-off areas (FATO), beyond the sloping ground.

1.2 Injuries to Persons

Table 1. Injuries to persons

Injuries	Flight crew	Cabin crew	Other crew on-board	Passengers	Total on-board	Others
Fatal	0	0	0	0	0	0
Serious	0	0	0	0	0	0
Minor	0	0	0	0	0	0
None	2	0	0	7	9	0
TOTAL	**2**	**0**	**0**	**7**	**9**	**0**

The flight crew did not sustain any injury due to the Accident. The passengers evacuated the Aircraft and due to the intervention of the security personnel, it was not immediately possible for the crew to determine whether any of the passengers had sustained injuries. Later, it became apparent that none of the passengers had been injured as a result of the Accident.

1.3 Damage to Aircraft

The Aircraft sustained significant damaged due to the impact, which caused the undercarriage to collapse. The tail rotor made ground contact and the underside of the Aircraft was substantially damaged.

Figure 1. Damage to the Aircraft

1.4 Other Damage

There was no damage to property or the environment.

1.5 Personnel Information

The Captain was licensed and qualified for the flight in accordance with the *Civil Aviation Regulations* of the United Arab Emirates and, although he was not rostered for duty, he was legally able to undertake the flight within the company's approved duty time limitations scheme.

The SP was licensed and qualified for the flight in accordance with the *Civil Aviation Regulations* of the United Arab Emirates.

1.6 Aircraft Information

1.6.1 Airworthiness

The Aircraft was airworthy at the time of the Accident. The structural and systems evaluation of the airframe and systems did not indicate any pre-existing failures prior to the Accident.

1.6.2 Aircraft general data

The AW109SP is a high-speed, high-performance, multi-purpose helicopter powered by two Pratt and Whitney Canada PW207C engines.

The passenger cabin is designed to carry six passengers seated on two three-seat benches. The Operator used standard passenger weights. The standard weight for a male passenger was 80 Kg.

1.7 Meteorological Information

There was no meteorological information specific to the Emirates Palace Hotel Heliport available to the crew, and the heliport was not equipped with a wind direction indicator.

The weather conditions were obtained from Abu Dhabi International Airport which was the closest available source of weather information. The conditions were described as CAVOK. The weather conditions were not a factor in this Accident.

1.8 Aids to Navigation

None of the ground-based navigation aids, aerodrome visual ground aids, or their serviceability, were a factor in this Accident.

1.9 Communications

The Aircraft was equipped with a Radio Management System, a VHF/AM1 System, a VHF/AM2 System, an Audio Integrating System and a SATCOM air-cell telephone system.

This equipment was serviceable and was not a factor in the Accident.

1.10 Aerodrome Information

Emirates Palace Hotel Heliport was adjacent to the hotel. It was used primarily for the arrival and departure of hotel guests.

The heliport was uncontrolled and there was no heliport landing officer (HLO).

1.11

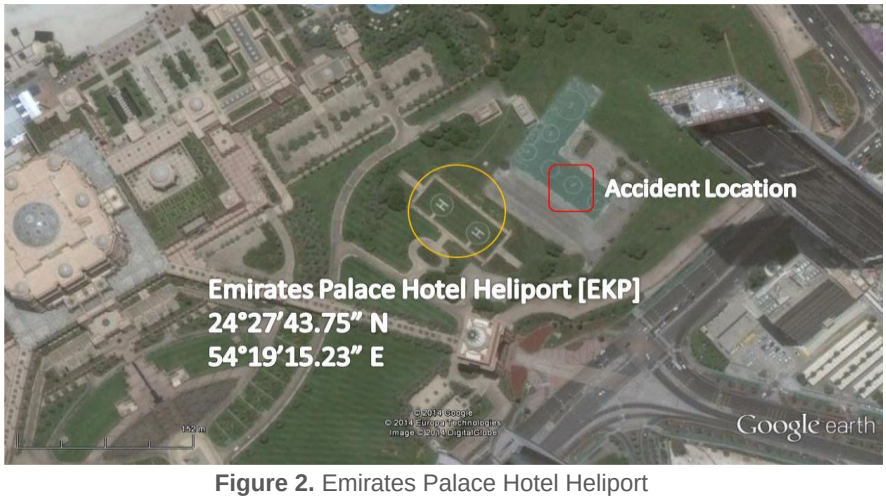

Figure 2. Emirates Palace Hotel Heliport

Flight Recorders

For this category of public transport operation, there are no *Civil Aviation Regulations* requirements for either a flight data recorder or cockpit voice recorder.

1.12 Wreckage and Impact information

The Aircraft was substantially damaged, but the main assemblies were in place.

The location of the Accident site was in the area adjacent to the heliport, on a 045 heading from the heliport.

1.13 Medical and Pathological Information

Although there were no requirements in the *Civil Aviation Regulations* that Alcohol and drug testing be conducted, the Captain and the SP were tested on the day following the accident (16 December 2014). The tests were completed with negative results.

1.14 Fire

There was no evidence of fire.

1.15 Survival Aspects

After the impact, the SP followed the Captain's instructions to shut down the engines, apply the rotor brake, and shut off the fuel valve. The Captain instructed the passengers to remain seated until the rotors stopped, but they disembarked while the rotors were still turning. The rotors were considerably closer to the ground due to the collapsed landing gear.

After the Aircraft struck the ground, a number of people assembled around the Aircraft and caused some confusion regarding removing the passengers from the Accident site. The flight crew were unable to ascertain who had been on-board the Aircraft and whether there were any injured passengers.

The emergency locator transmitter (ELT) was triggered and detected by the Abu Dhabi Search and Rescue Mission Coordination Center (MCC), indicating that a signal was received by the COSPAS SARSAT System during this period.

The passengers were evacuated by the security personnel to a secure area adjacent to the hotel complex.

1.16 Tests and Research

No tests or research were carried out.

1.17 Organizational and Management Information

The operator is a charter airline based at Al-Bateen Executive Airport, Abu Dhabi, the United Arab Emirates. The operator commenced operations in 2006 and was certified for the carriage of passengers by the General Civil Aviation Authority (GCAA) of the United Arab Emirates. The operator operates a fleet of helicopters and business jets.

1.18 Additional Information

1.18.1 Human factors

The Captain was on his day off. He was contacted by the FAS Operations Department and asked if he would operate a flight later that day.

The Captain was informed by the FAS Operations Department that the flight would operate to Al Marmum, and that it would be accompanied by another helicopter which was operated by a different company, Liwa. He arrived at Al-Bateen Palace and proceeded with the pre-flight checks. On completion, he briefed the SP on the destination.

The Aircraft departed for Emirates Palace Hotel and the passengers arrived at the helipad at approximately 1830 LT. The Captain focused his attention on setting up the cockpit as the passengers were boarding the Aircraft.

The SP communicated with the Liwa helicopter crew. The Captain checked the systems and confirmed that the Aircraft was ready for departure and all systems and gauges were normal. He put the Torque Limiter on and proceeded to depart.

As the Aircraft lifted into the hover, the autopilot disengaged, and the Captain instructed the Co-pilot to re-engage it. The Co-pilot re-engaged the autopilot.

The Aircraft climbed above the tree line surrounding the heliport. The Captain heard the over-torque warning again, and decided to attempt to land the Aircraft on the heliport pad located at the back of the VIP heliport. The Aircraft started to descend rapidly and impacted the road just in front of the other heliport pad. The Captain instructed the SP to shut down the engines and pull the rotor brake, which she did.

1.19 Useful or Effective Investigation Techniques

No new investigation techniques were used during this Investigation.

2. Analysis

2.1 Time between Reservation and Conducting the Flight

The Falcon Air Services (FAS) Sales Department received a reservation by phone at 1613 LT for a flight which would depart at 1715 (within approximately 1 hour). Accepting the reservation allowed only a very short time for flight preparation.

2.2 The FAS Sales Procedure

The FAS sales procedure stated that customer details must be obtained for flight planning purposes. The names, number, and weights of passengers were required for Aircraft weight calculations. This information had not been made available on time to the flight crew to enable them to complete the flight plan.

The passenger information, when provided to the flight crew by the FAS Flight Operations Department, was incorrect. The information indicated that there would be six passengers when, in fact, seven passengers boarded the Aircraft. The maximum capacity of the helicopter was six passengers. This lead to an incorrect passenger weight calculation and an unrestrained passenger in the cabin.

The actual calculation of the take-off weight was as follows:

- Operational empty weight: 2,316 kg
- Fuel: 430 kg
- Crew (2): 154 kg
- Passengers (7x80 kg): 560 kg

Total Aircraft take-off weight: 3,460 kg

The MTOW of the Aircraft was 3,175 kg. This resulted in a take-off weight exceedance of 285 kg.

2.3 The Safety Pilot (SP) Prevented in Carrying out her Duty

The SP was prevented from looking inside the passenger cabin, but confirmed that there were seven passengers on-board. One passenger was seated on the knees of another passenger. This passenger was not restrained. The SP was unable to conduct a passenger safety briefing and did not have an opportunity to check that all of the passengers were securely restrained.

2.4 Actual Number of Passengers on-Board

The SP informed the Captain that there were seven passengers on-board. The Captain acknowledged this information, but under pressure to depart, he began to initiate the takeoff despite the fact that the maximum passenger number had been exceeded by one, and that the take-off weight had not been calculated correctly. The Aircraft was heavy, and the investigation believes that this led to the autopilot disengagement and after autopilot re-engaged the torque increased above 92%, and the Aircraft descend rapidly and struck the ground.

2.5 *The Civil Aviation Regulations*

At the time of the Accident, referring to the *Civil Aviation Advisory Publication (CAAP) 70 – Heliports*, issue of June 2014, Rev 00, there were no regulatory requirements for the

heliports to be controlled by a Heliport Landing Officer to assist the passengers to board aircraft. This made the task of the crew very difficult and placed them under extreme pressure.

The October 2016 issue 02, Rev 00, of *CAAP 70*, Chapter 9 – *Emergency Response and Heliport Operations,* paragraph 9.1 – *Personnel Requirements*, stated that:

> "9.1.7 The heliport operator shall provide a Heliport Landing Officer (HLO),
>
> 9.1.8 A Heliport Landing Officer (HLO) is a responsible person responsible for ensuring that the physical aspect of the heliport is safe for helicopter operations.
>
> 9.1.9 The HLO shall ensure that:
>
> a) All necessary steps are taken to deny unauthorised persons' access to the heliport landing area prior to take-off and landing;
>
> b) the heliport is cleared of loose objects, people, vehicles etc.;
>
> c) the heliport is clear of any birds or other wildlife;
>
> d) all necessary personnel are present and at a state of readiness; and
>
> e) passengers are held in a safe zone during the landing or takeoff of helicopters and are under supervision while on the heliport operational area.
>
> 9.1.10 The HLO should wear identification clearly showing he is the responsible person during heliport operations. A tabard should be marked on the front and back with the letters HLO in a reflective material and should be clearly visible from a distance.
>
> 9.1.11 As the HLO is required to be present on the heliport during helicopter arrivals and departures, the heliport operator should appoint 'Heliport Assistants ' to assist the HLO with the administration of passengers and freight."

The Investigation believes that the implementation of these requirements will positively affect the safety of helicopter operations.

Helicopters operating at the Emirates Palace Hotel Heliport are required by *CAR OPS 3* of the *Civil Aviation Regulations* to be capable of Performance Class 1[1].

Helicopters using the Emirates Palace Hotel Heliport must be capable of Category 'A' performance in the event of an engine or systems failure.

2.6 Helicopter Operation Categories

A Category 'A' departure requires a multi-engine helicopter with the engine and system isolation as per *CAR OPS 3* and *flight manual* performance based on a critical engine failure concept which provides the adequate surface area with no obstacles and performance capability for continued safe flight if an engine fails. A Category 'A' departure ensures that there is sufficient power available should an engine fail by restricting the maximum take-off weight of the helicopter. It also provides space for rejected takeoff and landings and obstacle clearances.

[1] Performance Class 1 operations are those with performance such that, in the event of failure of the critical power unit, the helicopter is able to land within the rejected take-off distance available or safely continue the flight to an appropriate landing area, depending on when the failure occur

2.7 Flight Recorders

The Aircraft was not fitted, and was not required to be equipped, with flight recorders. Some of the installed Aircraft systems recorded flight parameters and engine data. The non-volatile memory of the equipment was successfully recovered and analysed at the operator's facility under supervision of the Investigation.

The data provided evidence of normal engine functioning during the entire flight. The engines responded in accordance with the collective inputs, and during the initial lift-off phase, the required engine torque was assessed at approximately 95% with a collective displacement of approximately 60%. In the subsequent seconds, the Captain increased the collective up to 70% and both engines reached a torque value of 110%. The 110% torque value is consistent with the torque limiting function being active during the flight. The torque limiter is normally inactive at aircraft power up and can be activated by the pilot using a press button on the collective control grip.

Approximately 17 seconds before the impact, as a result of the engines operating at maximum torque, the rotor rpm started to slowly decrease and the Captain reacted by applying more collective which resulted in a rotor rpm speed drop. Several seconds before the impact, the rpm had decreased to 75% with a collective input of more than 100%.

2.8 Crew Performance

2.8.1 The Captain

The Captain had completed a line check on the day prior to the Accident and he was scheduled to be off duty on the day of the accident. He had planned to spend his free time with his family. Between 1430 and 1500 LT the Captain received a call from FAS Operations asking him to operate a VIP flight later in the afternoon.

The Captain accepted the flight and left his family to drive to Al-Bateen Palace which was the originating point for the flight to Emirates Palace Hotel where the passengers would embark. FAS Operations provided some details of the planned flight as the Captain drove to Al-Bateen Palace. He was informed that there would be six passengers, but he was not given the passenger weights. He received confirmation at 1518 LT that the flight would operate.

The flight was scheduled to be conducted in formation with another helicopter, an AgustaWestland AW139, operated by Liwa.

FAS Operations contacted the Captain again and told him that the flight would be on standby for around three hours. The Captain spoke to the Liwa helicopter crew, who briefed him on aspects of the approach and landing at the destination. Also, as he was driving to Al-Bateen, he received a text message from the FAS Sales Department at 1635 LT, providing the destination coordinates.

When the Captain arrived at Al-Bateen Palace, he briefed the Co-pilot and informed her of changes to the flight plan. These changes had been advised to the crew by e-mail at 1705 LT, and included a 15-minute delay to the departure time, a change of destination, and that there was no longer a planned refueling stop. The crew were now under pressure to depart immediately. They checked the new destination on Google Maps and the Captain briefed the Co-pilot on the destination. The Captain informed the Co-pilot that they would be flying in formation with a Liwa helicopter. These last minute changes were significant and increased the pressure on the crew.

After the Captain arrived at Al-Bateen Palace (the flight departure location), he made a rough estimate of the fuel requirements. He knew that the planned refueling stop had been removed by FAS Operations. He instructed the fuel handler at Al-Bateen to increase the fuel

based on this, and the Captain briefed the SP on the new destination and on the discussion that he had with the Liwa helicopter crew. The Aircraft departed for Emirates Palace Hotel and the crew rushed to ensure that they would arrive there at 1715 LT. The Captain flew the Aircraft. The passengers had still not arrived at Emirates Palace Hotel by 1800.

Analysis of the Captain's statement indicated that he was under time pressure to arrive at Al-Bateen Palace and later was subjected to further time pressure to position the Aircraft to Emirates Palace Hotel to operate the VIP flight. The crew had not been provided with sufficient information regarding the flight. In particular, they were not provided with the correct number of passengers, nor the passenger weights. Later, important information that had been provided to the crew was changed.

When the passengers arrived at the Emirates Palace Hotel Heliport, a chaotic scene unfolded involving security personnel and vehicles being driven in a fast and unusual manner around the Aircraft. This alarmed and upset the Captain. The Captain stated that he felt that things were happening very quickly and in a chaotic manner, and the activity around the Aircraft caused him to become stressed.

The Liwa helicopter, which had already taken off, contacted the Captain enquiring as to whether they had departed yet. The SP boarded the helicopter and informed the Captain that there were seven passengers on-board. The Captain repeated "seven". Shortly after this, the Captain applied power and the Aircraft lifted off. It is possible that the Captain, being subjected to very significant pressure, and to a stressful situation from the time that the passengers arrived, failed to grasp the significance of the information provided by the SP.

2.8.2 The Safety Pilot (SP)

The SP returned to duty on the day of the Accident following a vacation. She arrived at Al-Bateen Palace at 1530 LT and started to prepare for the flight which she was told would depart at 1715 LT. She noted that no aircraft had been allocated for the flight, that there would be six passengers, and that there was no passenger manifest, identifications, or weights.

The SP contacted FAS Operations as she was concerned that no passengers weight had been provided and that the aircraft allocated to the flight was A6-FTP, which was the heaviest aircraft in the fleet.

The passengers arrived in a convoy of approximately 12 vehicles at 1830 LT. Many people exited the vehicles and the heliport was surrounded by cars and over 20 people. The cars engaged in extreme maneuvers and circled the heliport. Having previously flown VIPs, the SP said that this was "the most official and intimidating scene" that she had witnessed. Taken together with the time pressure that the crew had now been under for sometime, and the added responsibility of flying VIPs, this intimidating activity by the security personnel added to the stressfulness of the situation.

The accompanying Liwa helicopter was surrounded by people and began embarking their passengers. The SP noted the presence of what she took to be armed security personnel. The cars continued to circle the heliport and more people continued to exit the vehicles.

As the passengers boarded the Aircraft, the SP was physically prevented by armed security personnel from viewing the passenger compartment and she was unable to observe how many passengers had boarded.

Eventually, the SP was able to shine her torch into the passenger cabin and she noted that there were six passengers, plus one passenger who was seated on another passenger's knees, bringing the total number of passengers to seven. This "additional" passenger signalled aggressively to the SP to close the door and he leant over and attempted to close the door himself. The SP closed the door and went to the cockpit where she informed the Captain of the

situation and that there were seven passengers on-board. Despite considerable difficulties, the SP identified that there were seven passengers on-board a helicopter which had only six seats.

Therefore, one passenger was not secured in a seat. Due to the many adverse aspects surrounding the flight which included poor operational support and planning, insufficient information being provided to the crew, the existence of significant time pressure, delays and stress induced in both crew members during the arrival and boarding of the passengers; the capacity of the crew to make correct decisions was diminished.

The normally high professional standards exhibited by the flight crew had been eroded to the point where crucial decisions were either made incorrectly, or were not made at all. For instance, the additional passenger could have been directed to disembark. If he failed to do this, the Captain could have decided not to take off until there were only six passengers on-board. The same applied to the lack of the passenger weight information, the Captain should not have attempted the takeoff without this critical information. The Captain was informed of the unsecured passenger and repeated “seven” to the SP.

Due to the accumulated pressures of time, lack of critical flight safety information, the stressful atmosphere created by the activities of the VIP security personnel, the fact that this was a VIP flight, and the overall poor support of the operation; the Captain and the SP were placed in a position of escalating stress as one issue followed another.

2.9 Medical and Pathological Information

Alcohol and drug testing were not conducted for the Captain and Co-pilot on the day of Accident, but were conducted on the following day (16 December 2014). This delay could have affected the results of the tests.

There is no specific medical checklist for pilots involved in an incident or accident, however, the Aeromedical Examiner, depending on individual assessment, will carry out a full medical checkup/interview which excludes alcohol and drug abuse and excludes medical causes of fatigue. Any further tests and examinations were done based on the initial medical assessment.

3. Conclusions

3.1 General Information

To serve the objective of this Investigation, the following subheadings are included in section 3:

- **Findings** are statements of all significant conditions, events or circumstances in this Accident. The findings are significant steps in this Accident sequence but they are not always causal or indicate deficiencies.
- **Causes** are actions, omissions, events, conditions, or a combination thereof, which led to this Accident.
- **Contributing factors**: These are actions, omissions, events, conditions, or a combination thereof, which, if eliminated, avoided or absent, would have reduced the probability of the Accident occurring, or mitigated the severity of the consequences of the Incident. The identification of contributing factors does not imply the assignment of fault or the determination of administrative, civil or criminal liability.
- **Non-contributing safety issues:** These are actions, omissions, events, conditions, or a combination thereof, which did not contribute to the occurrence of this Accident but are considered a source of safety risk.

From the available evidence and derived analysis, the following findings, causes, and contributing factors were made with respect to this Accident.

3.2 Findings:

(a) The Aircraft was certified, equipped, and maintained in accordance with the existing *Civil Aviation Regulations* of the United Arab Emirates.

(b) The Aircraft was airworthy when dispatched for the Accident flight.

(c) The flight crew were licensed and qualified for the flight in accordance with the existing *Civil Aviation Regulations* of the United Arab Emirates.

(d) The passenger weight details were not made available to the flight crew, nor did they request this information.

(e) The crew were subjected to time pressure due to the poor quality and inaccuracy of the information provided to them by the FAS Operations Control Center.

(f) Before takeoff, the crew were subjected to a stressful environment due to the activities of the security personnel prior to and during the boarding of the passengers.

(g) The pressure exerted on the crew prior to departure led to the Aircraft taking off without essential tasks such as a safety briefing of the passengers and the disembarkation of the extra passenger being carried out by the flight crew.

(h) There was no regulatory requirement for this category of aircraft to be equipped with a data recording device.

3.3 Causes

The Air Accident Investigation Sector determines that the cause of the Accident was the attempted takeoff at an Aircraft weight which exceeded the approved maximum take-off weight (MTOW).

3.4 Contributing Factors

The Air Accident Investigation Sector determines the following contributing factors to the Accident:

(a) Failure of the flight crew to acquire the passenger information necessary to ensure that the flight would be conducted within the certified operational and technical parameters of the Aircraft.

(b) The failure of the crew to control the passenger boarding process and to take appropriate action when it was observed that the maximum allowable number of passengers had been exceeded.

(c) The operator's lack of policy designed to mitigate the particular risks associated with VIP operations.

4. Safety Recommendations

4.1 General

The safety recommendations listed in this Report are proposed according to Standard 6.8 of *Annex 13 to the Convention on International Civil Aviation*, and are based on the conclusions listed in part 3 of this Report, the AAIS expects that all safety issues identified by the Investigation are addressed by the receiving States and organisations.

4.2 Final Report Safety Recommendations

The Air Accident Investigation Sector recommends that:

4.2.1 The General Civil Aviation Authority of the United Arab Emirates, to

SR01/2018

Ensure that certified heliports have procedures requiring helicopter operations be controlled and have landing officers available during operations.

SR02/2018

Provide guidelines, for inclusion in security personnel training, to VIP security organizations on the importance of adherence to flight crew safety instructions and aviation safety procedures.

4.2.2 Falcon Aviation Services, to

SR03/2018

Assess the operational risks of VIP flights including boarding and cabin safety procedures.

SR04/2018

Introduce into CRM training an emphasis on the authority of the flight crew in relation to air safety and security as this relates to VIP flights whose passengers are protected by a security detail. The training should reinforce that the flight crew have full authority in relation to all flight safety and security related aspects of the flight.

This Report is issued by:

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