FINAL DISSERTATION

"SAFETY MANAGEMENT SYSTEM (SMS) ON AIRCRAFT GROUND HANDLING"

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APPENDIX – II

Acknowledgement

This is to acknowledge with thanks the help, guidance and support that I have received during the Dissertation.

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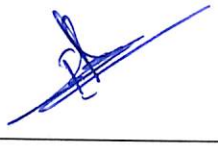
Declaration by the Guide

This is to certify that the Ms. Sadia Naoreen Mumu, a student of BBA (AO), SAP ID 500064724 of UPES has successfully completed this dissertation report on "SAFETY MANAGEMENT SYSTEM (SMS) ON AIRCRAFT GROUND HANDLING" under my supervision.

Further, I certify that the work is based on the investigation made, data collected and analysed by her and it has not been submitted in any other University or Institution for award of any degree. In my opinion it is fully adequate, in scope and utility, as a dissertation towards partial fulfilment for the award of degree of BBA.



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Executive Summary:

Airline Operations and Ground handling (GH) Department is responsible for all aspects of the safe, cost-effective and punctual running of their allocated base airline operation.

Ground handling is a critical activity at an airport and acts as an interface between the airport and the airlines. Ground handling services include all the services for an aircraft needs during the period it remains on the ground. Ground handling plays an important role in improving efficiency at the airport and is been increasingly seen as a key part of airport operations than just a profit stream. According to the International Air Transport Association (IATA), conservative estimates indicate airlines outsource more than 50 per cent of the ground handling that takes place at the world's airports.

Ground handling service agent deals with very diverse tasks. They provide services in five different operational areas.

1. Ramp Services
2. Passenger and Crew Services
3. Cargo and Mail Services
4. Load control, Communication and Flight Operations Services and
5. Representation and Security Supervision Services

On the other hand, Aircraft Ground handling service providers should construct a safety management system (SMS), as well as a health and safety programme to educate its team and make aware of possible hazard within its area of operation. Speed, efficiency, and accuracy are important in ground handling services in order to minimize the turnaround time. As aviation throughout the world continues to grow the airports become busier and more congested, the number of flights and the size of aircraft increases, the requirement for the Ground Safety Management System (GSMS) for airline and airports became very essential and plays a vital role in the airline safety arena.

As such, it is prudent to view ground handling from a strategic perspective than just from a financial perspective.

Chapter 1: Introduction

1.1 Overview

What is aircraft ground handling? Ground Operations or Aircraft ground handling involves all aspects of aircraft handling at airports as well as aircraft movement around the aerodrome. Aircraft ground handling is defined as the servicing of an aircraft while it is parked on the ground at a terminal gate or apron or tarmac of an airport.

Ground handler or ground handling agent provides many services for an aircraft between the time it arrives at a terminal gate and the time it departs for its next flight. The safety challenges of ground operations arise directly from those operations by ensuring that aircraft are not involved in collisions and that the jet efflux from large aircraft does not endanger small ones.

As a very common saying, "Flying is the safest form of transport", it is a common expression of which the modern aviation industry is justifiably proud. The safety in air and ground and security of our air transport system is no coincidence.

Throughout the history of flight, safety has been top on the list. This dedication to safe operations is seen across the whole aviation sector and became a huge progress in today's airline industry.

The **Ground Safety Management System (GSMS)** is an integral part of the airline industry and takes on many forms including standard operating procedures (SOP), adoption of new technology, modern airports and safety culture.

Air transport is one the most dynamic industries in the world and safety is the driving force behind every airline, handling agent and airport operations.

1.2 Aviation History

The history of aviation brims with airplanes that have represented the peak of design: swift fighters, long-range bombers and transports, exciting sport biplanes, experimental airplanes that used the sky as a laboratory. The dream of human flight must have begun with observation of birds soaring through the sky. The transformational airplane is a rarity, and surprisingly, many are not as well-known as they should be. The history of aviation extends for more than two thousand years, from the earliest forms of aviation such as kites and attempts at tower jumping to supersonic and hypersonic flight by powered, heavier-than-air jets.

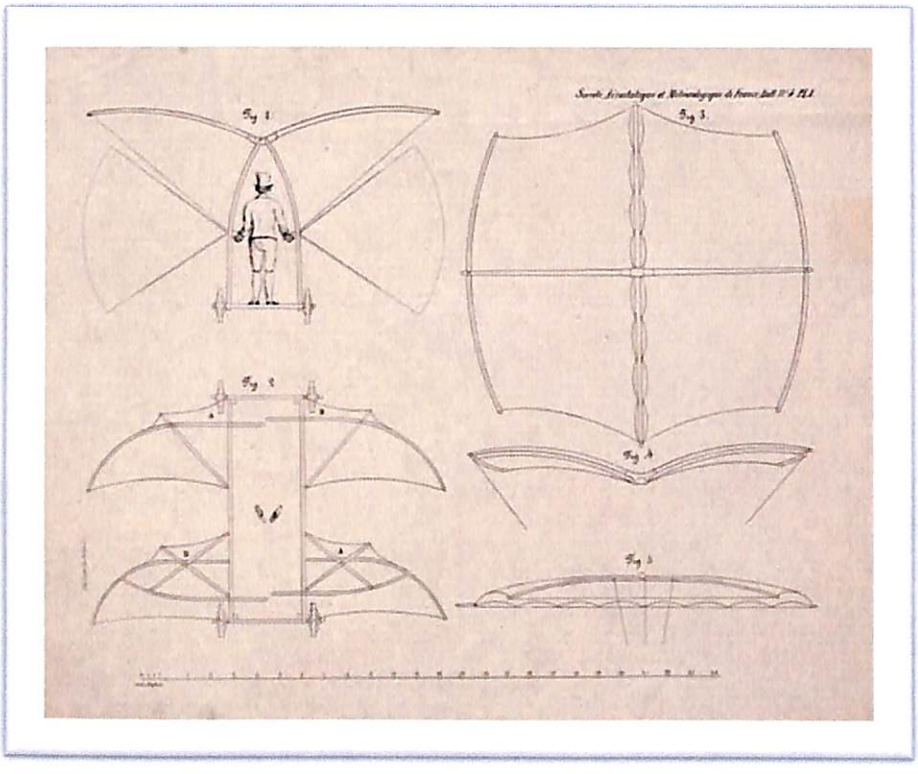


Figure: English aeronautic pioneer George Cayley established the modern notion of a fixed-wing aircraft in 1799, and he designed a glider (shown in the drawing) that was safely flown by his reluctant servant in 1853 in the first recorded successful manned flight.

Thus, the story of the invention of the airplane begins in the 16th, 17th, and 18th centuries, with the first serious research into aerodynamics—the study of the forces operating on a solid body.

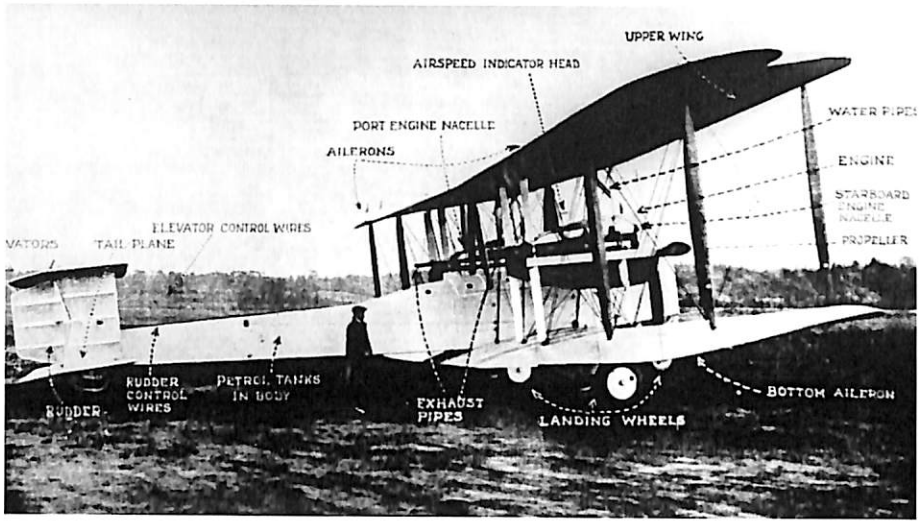


Figure: Vickers Vimy twin-engine biplane, a converted WWI bomber, flown by former RAF fliers John Alcock and Arthur Whitten Brown on their nonstop transatlantic flight.

Sir George Cayley was first called the "father of the aeroplane" in 1846. During the last years of the previous century he had begun the first rigorous study of the physics of flight and would later design the first modern heavier-than-air craft.

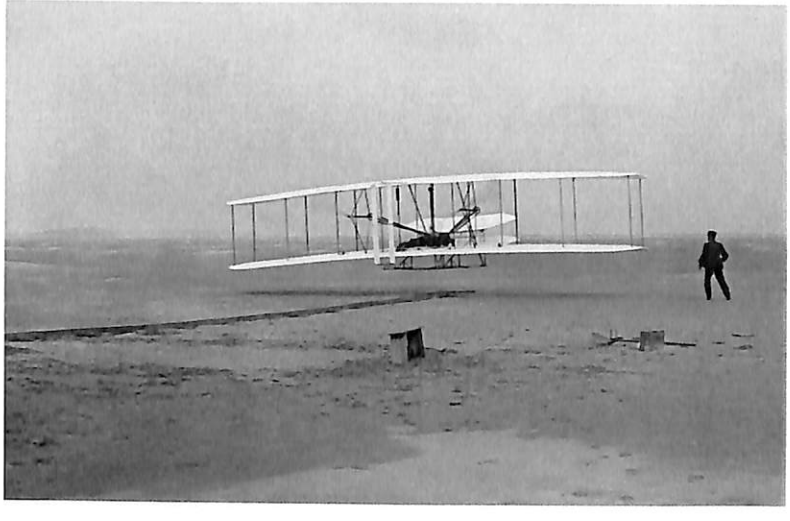


Figure: Orville and Wilbur Wright first practical flying machine.

The Wrights appear to be the first to make serious studied attempts to simultaneously solve the power and control problems. Both problems proved difficult, but they never lost interest.

Figure: Douglas DC-3 passenger aircraft.

The plane that changed the world, the DC-3 was the first aircraft to enable airlines to make money carrying passengers. As a result, it quickly became the dominant aircraft in the United States. The DC-3 had 50 percent greater passenger capacity than the DC-2 (21 seats versus 14). It also was considered a safer plane built of an aluminium alloy stronger than materials previously used in aircraft construction.

In 1969 marked the debut of revolutionary aircraft the Boeing 747. It was the first wide-body jet, with two aisles, a distinctive upper deck over the front section of the fuselage and four engines with seating for as many as 450 passengers.

Figure: Airbus A320

Airbus A320 short-to medium-range jetliner which first flew in 1987 and went into commercial service the following year. The aircraft typically accommodates 150 passengers. Its success led to a family of derivative aircraft of varying passenger capacities, including the A318, A319 and A321.

Figure: Boeing 747

The Boeing 747 is an American wide-body commercial jet airliner and cargo aircraft. The first wide-body airplane produced; it was the first plane dubbed a "Jumbo Jet". Its distinctive hump upper deck along the forward part of the aircraft has made it one of the most recognizable aircraft.

Figure: Airbus A380

The Airbus A380 is a double-deck, wide-body, four-engine jet airliner manufactured by the European aircraft company Airbus. It is the world's largest passenger airliner. The A380 made its first flight on 27 April 2005 and entered commercial service in October 2007.

1.3 Different Governing Bodies & Functions for Airlines

ICAO

The International Civil Aviation Organization (ICAO) a specialized agency of the United Nations (UN) codifies the principles and techniques of international air navigation and fosters the planning and development of international air transport to ensure safe and orderly growth. ICAO was created in 1944 as a result of the agreements of the Chicago Convention on International Civil Aviation signed in Chicago on 07/12/1944 to promote the safe and orderly development of international civil aviation throughout the world.

It sets standards and regulations necessary for aviation safety, security, efficiency and regularity, as well as for aviation environmental protection. The Organization serves as the forum for cooperation in all fields of civil aviation among over 190 Member States. Its headquarters are located in the Quartier International of Montreal, Quebec, Canada.

IATA

The International Air Transport Association (IATA) is its global trade organization founded in Havana, Cuba in April 1945. IATA is an independent body sponsored by and designed to serve and represent the airline travel industry. It has become an important body for raising standards in the industry through agreements, training and information. Today, IATA mission is to represent, lead and serve the airline industry. Its members comprise over 230 airlines including the world's leading passenger and cargo airlines and representing about 93% of scheduled international air traffic.

IATA seeks to improve understanding of the industry among decision makers and increase awareness of the benefits that aviation brings to national and global economies.
IATAs aim is to help airlines help themselves by simplifying processes and increasing passenger convenience while reducing costs and improving efficiency.

Moreover, safety is IATAs number one priority and IATAs goal is to continually improve safety standards.

CAA

Civil aviation is one of two major categories of flying, representing all non-military aviation, both private and commercial. Most of the countries in the world are members of the International Civil Aviation Organization (ICAO) and work together to establish common standards and recommended practices for civil aviation through that agency.

Civil aviation includes two major categories:

- Scheduled air transport, including all passenger and cargo flights operating on regularly scheduled routes; and
- General aviation (GA), including all other civil flights, private or commercial

FAA

The Federal Aviation Administration (FAA) is an agency of the United States Department of Transportation with authority to regulate and oversee all aspects of civil aviation in the U.S. It is responsible for setting up the federal aviation regulations (FAR) which are binding for all flight operations in the US. The FAA also provides air traffic control service at most control towers and all en-route air traffic control centres.

The FAA extended to included aircraft operations, licensing and certification/design standards for all classes of aircraft.

EASA

The European Aviation Safety Agency (EASA) is an agency of the European Union (EU) with offices in Cologne, Germany, which has been given regulatory and executive tasks in the field of civilian aviation safety. It was created on 15 July 2002 and it reached full functionality in 2008 taking over functions of the JAA (Joint Aviation Authorities).

The agency's responsibilities include: expert advice to the EU for drafting new legislation; implementing and monitoring safety rules, including inspections in the Member States; type-certification of aircraft and components.

As well as the approval of organizations involved in the design, manufacture and maintenance of aeronautical products; authorization of third-country (non-EU) operators; safety analysis and research.

1.4 Purpose of the Study

Safe and efficient ground handling is an essential part to every airline operation. The ground safety is of great importance to airlines and airport operators who want to prevent or reduce reasonably all foreseeable and unforeseeable risks of accidents - personal injuries, material damage and possible impact on aircrafts and airport operations.

The global airline industry is rapidly growing. Speed, efficiency and accuracy are important in ground handling services in order to minimize the turnaround time. The importance of aircraft ground handling services plays a vital role for the airline industry – the aircrafts, crew and passengers.

Aircraft ground handling costs a lot of money to the airlines. Every airline wants to limit the expenses by promoting cost and time efficiency by reducing turnaround times and handling costs.
My research begins with a brief summary on the aviation history, aircrafts model, airport operations and ground handling that incorporates equipment, functions, safety risk[1] assessment and safety culture.

As aviation throughout the world continues to grow the airports become busier and more congested, the number of flights and the size of aircraft increases, the requirement for the Ground Safety Management System (GSMS) for airline and airports became very essential and plays a vital role in the airline safety arena.

1.5 Research Hypothesis: Risk Assessment Matrix & Solution Domain

Step 1: The research will examine the perspective of providing airlines a comparative picture of ground handling and safety involvement.

Step 2: Investigation on research for ground handling process and equipment.

Step 3: After the research has been completed, a comprehensive risk assessment will show the risk associated with a specific activity on ground, equipment and aircrafts.

Step 4: The risk assessment will be conducted for every task carried out by ground staff and equipment on ground.

Step 5: Steps for the risk assessment for safety in ground handling:

- Identify the hazards
- Decide who may be harmed and how
- Evaluate the risks and decide whether the existing control measures are adequate or whether more should be done
- Review the assessment and revise if necessary
- Identify the tasks and areas to be assessed
- Analyse and break down the tasks into manageable pieces
- Decide whether further action is needed to reduce the level of risk
- Complete and communicate the assessment results
- Review the assessment regularly whenever there is a change to the circumstances, or when there is an accident, incident or serious occurrence.

Step 6: After the risk assessment has been completed the hazards with highest probability and severe consequences will be identified (Risk Matrix).

Step 7: The hazards with highest probability are generally the ones that need to be addressed first.

Step 8: To develop an action plan for remedial to eliminate or reduce the risk to a level as low as reasonably practicable.

Step 9: Train staff and create a Safety culture.

Step 10: Create GSMS awareness and practice.

Chapter 2: Airline Industry:

2.1 Ground Handling Equipment

Equipment involved in ground handling services are as follows.

- Ground Power Unit (GPU)
- Air Conditioner Unit (ACU)
- Air Start Unit (ASU)
- Aircraft Heater Unit (AHU)
- Aircraft Push Back
- Tug & Tow Bars
- Belt Loader
- Passenger Stairs
- Container Loader
- Lavatory Truck
- De-icer
- Fuel Truck
- Water Truck
- Catering Truck
- Aircraft Cleaning

Aircraft Ground Handling Equipment & Services

Figure: Ground Power Unit (GPU)

Ground Power Unit, or GPU for short, is the name given to power supply equipment that provides clean power for both maintenance and engine starting aircraft that are on the ground. A ground power unit (GPU) is a vehicle capable of supplying power to aircraft parked on the ground. Ground power units may also be built into the jet way, making it even easier to supply electrical power to aircraft. Many aircraft require 28 V of direct current and 115 V 400 Hz of alternating current.

Figure: Air Conditioner Unit (ACU)

For Aircraft air cabin cooling during night stop (for maintenance operation) or before passenger boarding. Two main type of Air Conditioning Unit: diesel-powered Air-Conditioning Unit for fully autonomous mode and Electrically powered Air Conditioning Unit when 50Hz power supply is available in the apron.

Figure: Air Start Unit (ASU)

ASUs are used for starting aircraft engines equipped with pneumatic starter. It supplies necessary quantity of air at specified pressure through one/two or three hoses attached to the aircraft under belly.

Figure: Aircraft Heater Unit (AHU)

For Aircraft air cabin heating during night stop (for maintenance operation or in anti-freeze mode) or before passenger boarding. Two main type of heater: diesel powered cabin Heater for fully autonomous mode and Electrical Heater when 50Hz power supply available in the apron.

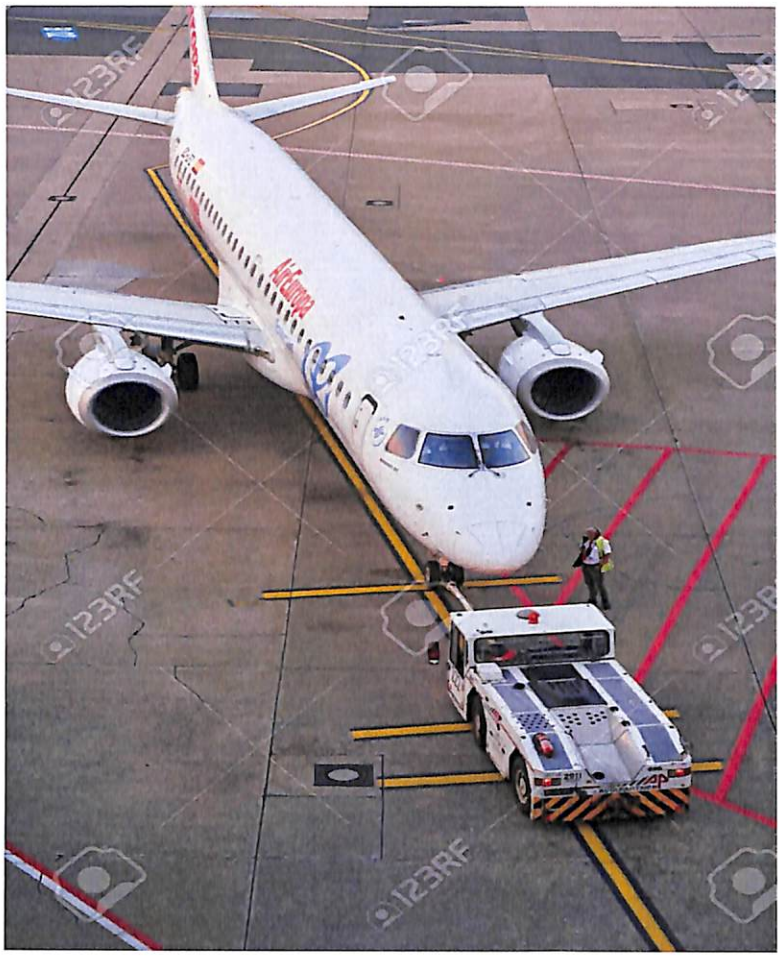


Figure: Aircraft Pushback Truck

Pushback is an airport procedure during which an aircraft is pushed backwards away from an airport gate by external power. Pushbacks are carried out by special, low-profile vehicles called pushback tractors or tugs. Although many aircraft are capable of moving themselves backwards on the ground using reverse thrust the resulting jet blast or prop wash may cause damage to the terminal building or equipment.

Figure: Tug & Tow Bars

Conventional tugs use a tow bar to connect the tug to the nose landing gear of the aircraft. The tow bar is fixed laterally at the nose landing gear but allowed to move slightly vertically for height adjustment. At the end that attaches to the tug, the tow bar may pivot freely laterally and vertically. In this manner the tow bar acts as a large lever to rotate the nose landing gear. Each aircraft type has a unique tow fitting. The tow bar must be long enough to place the tug far away enough to avoid hitting the aircraft.

Figure: Belt Loader

Belt loaders are vehicles with conveyor belts for unloading and loading of baggage and cargo onto aircraft. Belt loaders are a unique type of equipment used by the Airline Industry to transfer baggage and cargo to and from the aircraft bin. Belt loaders are used for narrow body aircraft, and the bulk hold of wide body aircraft.

Figure: Passenger Stairs

An air stair is a set of steps built into an aircraft so that passengers may board and alight the aircraft. The stairs are often built into a clamshell-style door on the aircraft. Air stairs eliminate the need for passengers to use a mobile stairway or jet way to board or exit the aircraft, providing more independence from ground services.

Figure: Container Loader

A unit load device (ULD) is a pallet or container used to load luggage, freight, and mail on wide-body aircraft and specific narrow-body aircraft. It allows a large quantity of cargo to be bundled into a single unit. Since this leads to fewer units to load, it saves ground crews time and effort and helps prevent delayed flights. Each ULD has its own packing list (or manifest) so that its contents can be tracked.

Figure: Lavatory Truck

An aircraft lavatory is a small room on an aircraft with a toilet and sink. Lavatory service vehicles empty and refill lavatories onboard aircraft. Waste is stored in tanks on the aircraft until these vehicles can empty them and remove the waste. After the tank is emptied, it is refilled with a mixture of water and a disinfecting concentrate, commonly called 'blue juice'. Instead of a self-powered vehicle, some airports have lavatory carts, which are smaller and must be pulled by tug.

Figure: De-icing Truck

Not just removing, but also preventing a build-up of snow and ice on the wings and tail of an airplane is crucial for a safe take-off. A plane's wings and rear tail component are engineered with a very specific shape in order to provide proper lift for flight. Snow and ice on these areas in essence changes their shape and disrupts the airflow across the surface, hindering the ability to create lift. De-icing is defined as removal of snow, ice or frost from a surface. Anti-icing is understood to be the application of chemicals that not only de-ice, but also remain on a surface and continue to delay the reformation of ice for a certain period of time, or prevent adhesion of ice to make mechanical removal easier.

Figure: Fuel Truck

A fuel truck is a motor vehicle designed to carry liquefied loads, dry bulk cargo or gases on roads. Many variants exist due to the wide variety of liquids that can be transported. Tank trucks tend to be large; some are semi-trailer trucks.

Figure: Water Truck

Commonly use is to deliver lavatory water services and cleaning purposes. Potable water trucks are special vehicles that provide reliability and consistency in the delivery of quality water to an aircraft. The water is filtered and protected from the elements while being stored on the vehicle. A pump in the vehicle assists in moving the water from the truck to the aircraft.

Figure: Catering Truck

A food truck is a large vehicle equipped to cook and sell food. Some, including ice cream trucks, sell frozen or pre-packaged food; others have on-board kitchens and prepare food from scratch. Sandwiches, hamburgers, French fries, and other regional fast food fare is common.

Figure: Aircraft Cleaning

Interior and exterior aircraft cleaning, seat cover upholstery replacement, carpet cleaning services, deep cleaning, fuselage, wings and windows etc.

2.2 Operational Analysis: Services & Applications

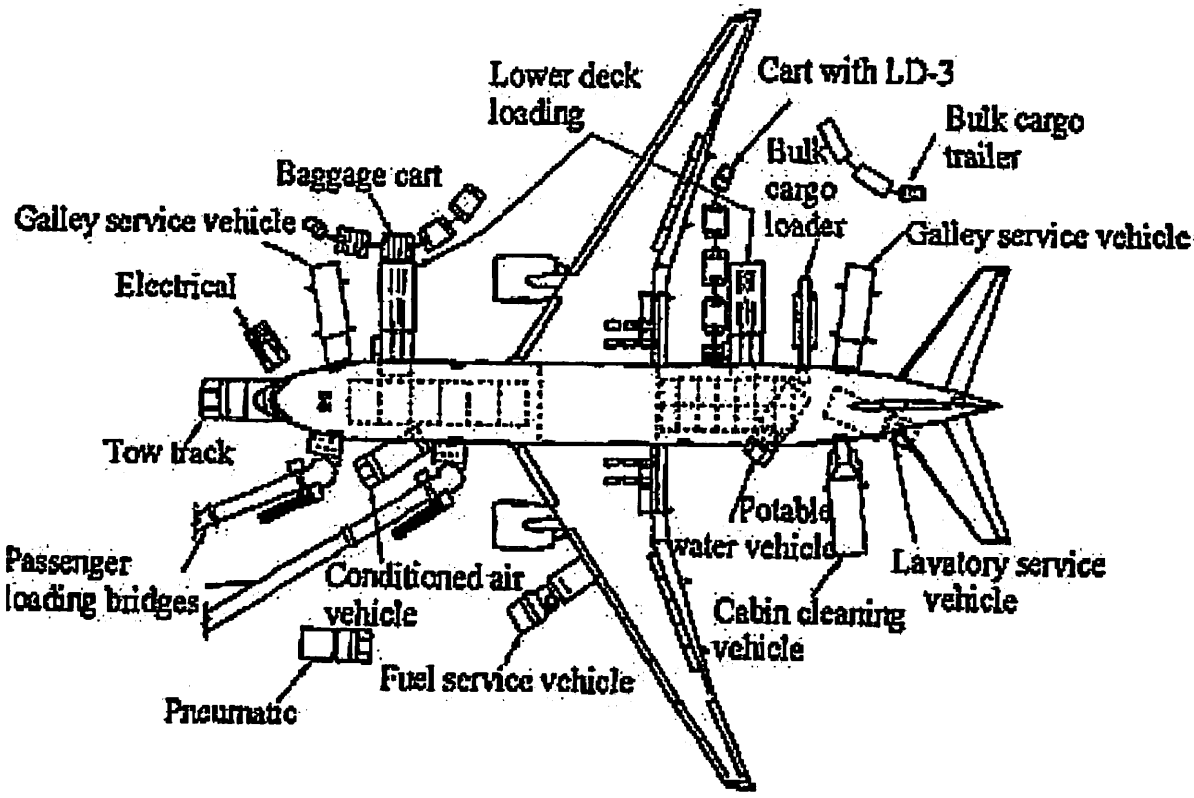


Figure: Layout of Operations on Ground

Aircraft arrivals and departures are usually attended by a handling team.

Services at Apron/Ramp:

- Meeting and marshalling the aircraft
- Offloading and loading the aircraft
- Provision of Ground Power Unit (GPU), Air Condition Unit (ACU) and Aircraft Push-Back whenever requested by flight crew.
- Provision of toilet and water services to the aircraft
- De-icing of aircraft in adverse weather conditions and taking measures for anti-icing
- Coordination with fuel and aircraft catering companies

Air Traffic Control and Flight Operation Services:

- Coordination of aircraft servicing units
- Preparation and distribution of flight documents (customs declaration, loading instruction, load sheet, manifest, weather forecast, flight plan etc.)
- Load control, weight and balance calculations
- Airport slot applications

Passenger Comfort/Services:

- Incoming passenger acceptance and guidance to baggage claim areas and terminal exit
- Lost, damaged and transfer baggage processes of incoming passengers
- Incoming and outgoing VIP, unaccompanied children and special care passenger services
- Specially trained personnel for disabled passengers
- Passenger Interline Transfer service, provides transfer connections for those who use a Hub[1]
- Other services like passenger check-in, service desk, boarding gate passenger reconciliation, Charter service facilitation and ticketing.

2.3 Ground Handling Time Management

Ground handling management has to deal with very diverse tasks. Preferably, these operations are performed simultaneously to decrease ground time and thus to increase aircraft productivity. Airlines pay at the most part for the delays that their aircrafts experience. Therefore, they strongly emphasize the time-efficiency of ground operations provided either by themselves, or the airport authority or independent companies.

It makes the task even tougher for ground handlers whose efficiency relies on technology-advanced equipment, coordination of staff and information support systems.

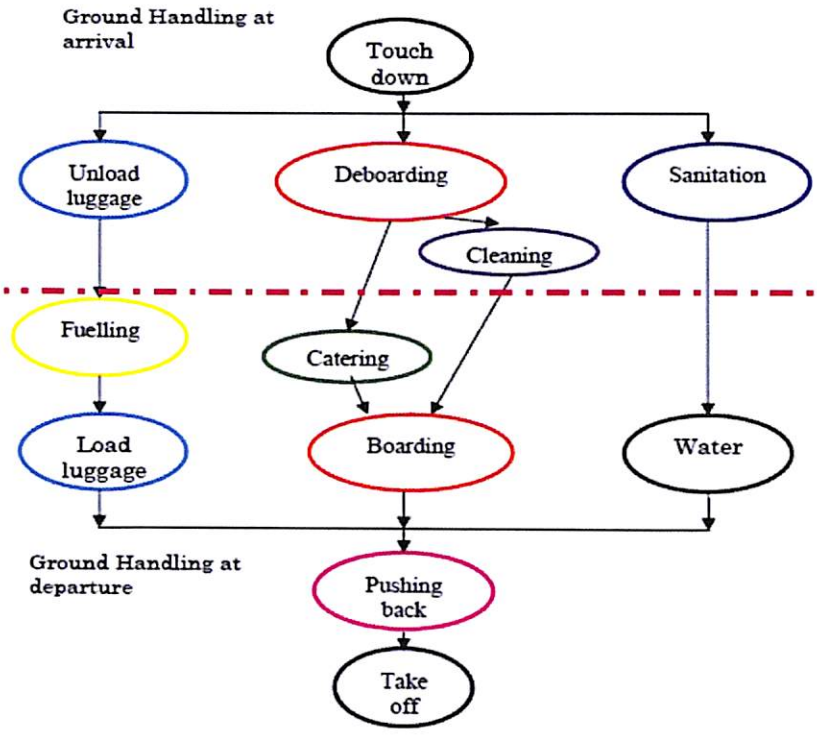
Accuracy, speed and quality of service are the central elements of successful ground handling operations. With service level agreements becoming more and more popular in ground handling contracts, real-time information is the key to on-time service delivery and end-to-end reporting. As ground handling is a high-volume, time-critical process, applications need to be closely integrated, the incorporation with the aeronautical billing solution ensures timely, consistent invoicing.

Accurate, real-time information is the key element of successful ground handling operations. Numerous parties are involved in running aviation processes; internal staff as well as business partners, airlines and authorities depend on this data to play their part in the integrated business processes.

Aircraft turnaround defines the process of servicing an aircraft while it is on the ground between two successive flights it operates. The turnaround term implies a fast sequence between an arrival and a departure, however for many air transport operations, in particular for long haul flights, a large time interval may be programmed between them.

During the turnaround, an aircraft must undergo a complex process composed of a set of elementary ground handling activities such as landing/boarding, unloading/loading of luggage, fuelling, catering, cleaning, water and sanitation processes.

2.4 Ground Handling Typical Process Activities



Ground handling operations are in general carried out by different service companies, using vehicle which are specific to each type of operation.

To perform the turnaround process for each aircraft within the allocated time, these different companies have to coordinate between each other while respecting the constraints of scheduling tasks for each aircraft and the constraints related to the use of service vehicles.

The duration of each ground handling operation is variable from one flight to another and depends in general of the type of aircraft, the volumes of passengers/luggage to be processed as well as of other external factors such as the current weather conditions at the airport.

Chapter 3: Ground Safety Management System (GSMS)

3.1 Overview

Safety is the state in which the risk or damage to property or to people is reduced and maintained at or below acceptable level through a continuing process of hazard identification and risk management.

Ground Safety Management System (GSMS) is a systematic, explicit and comprehensive process for the management of safety risks that integrates flight operations, ground operation and technical systems with human resource management.

3.2 The Four Basic Components of GSMS

a) Safety policy

b) Safety risk management

c) Safety assurance and

d) Safety promotion

a) Safety Policy – the policies, procedures and structure of the organization described with the fundamental value of safety within the organization.

b) Safety Risk Management - is the process of hazard identification and management of risk to acceptable levels. This systematic process describes how to identify hazards, how to assess the risks and then the procedures to control the risks.

c) Safety Assurance - processes ensure that once risk controls are in place, the organization continues to review the safety initiatives to make sure that risks are maintained within acceptable levels as defined by the organizations safety policies and goals.

d) Safety Promotion - is the ongoing process to promote safety within the organization.

3.3 Safety Challenges at Ground Handling

- Ensuring that aircraft are not damaged by debris left on the aircraft manoeuvring areas.
- Ensuring safe parking and docking of aircraft.
- Minimizing the risk of impact damage to parked aircraft and ensuring that any such impact, even if apparently minor, is reported and subject to maintenance inspection as appropriate prior to any further flight operation.
- Correct loading of the aircraft, and especially of its cargo and baggage, including any Dangerous Goods.
- Correct communication of aircraft loading information to the aircraft commander.
- Sufficient and verified fuel of adequate quantity and quality.
- The correct use of ground de/anti-icing facilities where appropriate.

3.4 Potential Hazards on the Bay or Apron

A hazard is defined as something that has the potential to cause harm to people and/or the loss of or damage to equipment, property or the environment. The systematic identification and control of all major hazards is the fundamental process in this GSMS.

It is important that all aircraft operations including turnaround times should take full account of the need for safe working practices. Failure to do this may result in short cuts and bad practice which can lead to accidents, ill health and damage to assets.

3.5 Common Hazards at Aerodromes or Apron includes

- Vehicles striking aircraft or people
- Hazards to passengers on the apron
- Moving aircraft including aircraft on pushback or being towed
- Live aircraft engines
- FOD
- Operation of airbridges
- Manual handling
- Work equipment and machinery
- Hazardous substances and Dangerous Goods like radioactive substances
- Inadequate lighting or confusing lights
- Adverse weather conditions
- Electrical hazards
- Faults and defects

Chapter 4: Human Factors

4.1 Overview

Human factors have been identified by the European Commercial Aviation Safety Team as a ground safety issue for which safety enhancement action plans have to be developed. The objective of this study is to investigate the causal factors which lead to human errors during the ground handling process and create unsafe situations, personal accidents or incidents. The results identified opportunities for improvement in the propagation of the safety policy and principles, standardisation of phraseology on the ramp and awareness of the potential risks of human factors like time pressure, stress, fatigue and communication.

Human factors are therefore concerned with applying what is known about human behaviour, abilities, limitations, and other characteristics to the design of systems, tasks/activities, environments, and equipment/technologies. It is also concerned with the design of training programs and instructional materials that support the performance of tasks or the use of technology/equipment.

Human factors refer to environmental, organizational and job factors and human and individual characteristics which influence behaviour at work in a way which can affect health and safety.

This definition suggests that human factors may negatively influence the behaviour of personnel at work. It is proposed that the opposite is also true: that proper attention to human factors in the working environment may positively influence the behaviour of personnel at work, which is considered a manifestation of an organization's safety culture.

In a good safety culture, the presence and effects of human factor s in the ground handling process are acknowledged, training is provided to manage human factors that may surface during the task performance and the risks they may introduce are mitigated as much as possible.

4.2 Investigation: On Most Common Incidents occurs on Ground

The GH participants were asked what kind of incidents occurs most frequently.

Operational disruptions - may be the result of human errors in the ground handling process but may also increase the risk on human error.

Equipment damage - the baggage tug or carts are damaged most often. The relative high frequency of damage of this equipment is possibly caused by the fact that more pieces of this equipment are used during the turnaround, making the exposure and risk of damage higher.

Aircraft damage - the cargo doors and passenger doors are damaged most frequently. This is probably caused by the fact that equipment has to be attached to several doors during each turnaround. Movement of either the equipment or the aircraft may result in damage to the aircraft fuselage in the vicinity of the door or to the door itself (seals, locking mechanism, etc.).

Personal injury - due to the high physical exertions that are required in the ground handling process especially while loading or unloading baggage or cargo, strain is considered as the most frequent personal injury.

Environmental impact - Contamination in ramp and spills of fluids as the incidents with an environmental impact that occur most frequently can be potential hazards.

Personal factors - Time pressure is considered as the most frequent contributing cause of human error. Next to time pressure, Stress and Fatigue are also mentioned as important factors, which may be related to time pressure.
In the interviews it was stated that another contributing factor to Fatigue is the notion that ground handling staff may have to work double shifts (for different employers) to generate sufficient income.

Communication - communication between staff and between departments is considered as human factors that may contribute to errors. Communication of safety information makes it possible to learn from safety occurrences and to take proactive action. It is therefore important to promote the development and use of a safety reporting system.

Environment/Facilities - One issue to consider is that the actual use of ground handling equipment may contribute to the impression that the equipment is poorly maintained. Equipment that is roughly or incorrectly handled will likely need maintenance earlier than scheduled.

In my opinion human errors are occasionally caused by the fact that working processes or procedures are not followed.

4.3 Breakdown in Communication:

Communication between staff and between departments is considered by both Management and Operational personnel as human factors that may contribute to errors. Operational personnel also provide a high frequency for communication between ramp personnel and supervisors, and between supervisors and management.

Communication of safety issues through the various levels of a GSP is considered important, since is raises the awareness of the role safety plays in the organisation. Communication of safety information makes it possible to learn from safety occurrences and to take proactive action. It is therefore important to promote the development and use of a safety reporting system. This was also one of the findings in the safety culture assessments, in which the safety reporting system was not known or not recognized as such by both Management and Operational personnel.

Chapter 5: Safety Culture

5.1 Overview

The safety culture of a group is the set of enduring values and attitudes regarding safety issues, shared among the members of the group. It refers to the extent to which the members of the group are positively committed to safety.

From safety culture - six main characteristics can be derived that together compose the safety culture of an organisation:

- Commitment: Reflects the extent to which every level of the organisation has a positive attitude towards safety and recognizes its importance.

- Justness: Reflects the extent to which safe behaviour and reporting of safety issues are encouraged or even rewarded, and unsafe behaviour is discouraged.

- Information: Reflects the extent to which safety related information is distributed to the right people in the organisation.

- Awareness: Reflects the extent to which employees and management are aware of the risks the organisation's operations imply for themselves and for others.

- Adaptability: Reflects the extent to which employees and management are willing to learn from past experiences and are able to take whatever action is necessary in order to enhance the level of safety within the organisation.

- Behaviour: Reflects the extent to which every level of the organisation behaves such as to maintain and improve the level of safety.

5.2 Safety culture indicators:

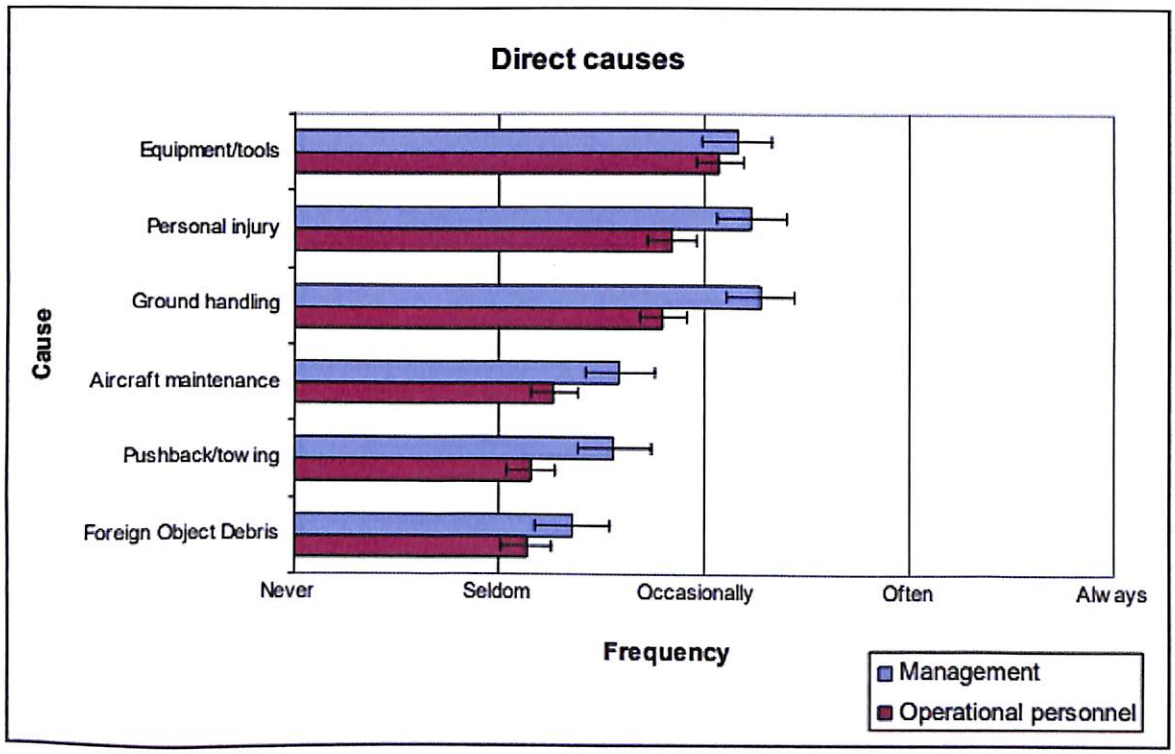
In order to enable to assess and analyse the level of safety culture of an organisation, and thereby indicating to what extent an organisation can be said to have a good safety culture.

Below lists the characteristics and their underlying indicators.

Characteristic	Indicators
Commitment	- Management concern - Personal concern - Investment in safety
Justness	- Evaluation of (un)safe behaviour - Perception of evaluation - Passing of responsibility
Information	- Safety training - Communication of safety related information - Safety reporting system - Willingness to report - Consequences of safety reports
Awareness	- Awareness of job induced risks - Attitude towards unknown hazards - Attention for safety
Adaptability	- Actions after safety occurrences - Proactiveness to prevent safety occurrences - Employee input
Behaviour	- Job satisfaction - Working situation - Employee behaviour with respect to safety - Mutual expectations and encouragement

5.3 Causes and Involvements:

By investigating the direct causes of the incidents, we can actually identify the type, time of appearance, frequency and cause of human factors in the ground handling process. Below figure provides the views of Management and Operational personnel with regard to the direct causes of accidents, incidents or human errors. The direct causes are ordered from high to low frequency, in which the average frequency indicated by Management and Operational personnel has been taken as reference.



Chapter 6: Conclusions

All faculty, staff, maintenance personnel, flight instructors and ground staffs are accountable for safety performance and practice.

In addition, all are committed to operating in safe, healthy, secure working conditions and promoting safety attitudes with the objective of having an accident-free workplace.

By assessing risks, we are able to be actively aware of where uncertainty surrounding events or outcomes exists and identifying steps that can be taken to protect the organization, people and assets concerned.

- Reduces turnaround delays and associated with ground handling service.
- Manage aircraft turnaround tasks efficiently & effectively.
- Increases cost saving potential through optimized resource planning.
- Full-service capture and tracking capabilities for ground handling service.
- Fleet management optimization for airlines.
- Effective resource and planning capabilities.
- Customer Satisfaction.
- Enhanced Safety Performance.
- Implementation of Ground Safety Management Systems (GSMS) for a systematic, explicit and comprehensive for managing risks to safety, and
- Reducing hazards and maintaining situational awareness.

SKYPLAN

Standard Ground Handling Service Agreement

Main Agreement

An Agreement made between _____ having its principal office at _____ hereinafter referred to as "the Carrier" or "the Handling Company" as the case may be, and _____ having its principal office at _____ hereinafter referred to as "the Handling Company" or "the Carrier", as the case may be, the Carrier and/or the Handling Company may here in after be referred to as "the Party(ies)".

Each party warrants that it has the right to enter into this Agreement and that execution of this Agreement has been signed by authorized representative(s) of each party.

Company Name:
Date:

_____
(Signature)

Company Name:
Date:

_____
(Signature)

SKYPLAN

b

Ground Handling Request

ATTN: AVIATION FBO

DEAR OPS,

GULF JET REQUESTS YOU TO ARRANGE GROUND HANDLING FOR THE FOLLOWING PVT FLIGHT:

OPERATOR	ABC JET
AIRCRAFT REGISTRATION	A1FAA
AIRCRAFT CALLSIGN	A1FAA
AIRCRAFT TYPE	BOMBARDIER GLOBAL G5000 (GL5T)
MTOW	92000 LBS
AOC	PVT FLT

FLIGHT SCHEDULE
20 DEC 2019 ETD OMAA 0400Z - 20 DEC 2019 ETA OKBK 0530Z FERRY
20 DEC 2019 ETD OKBK 0630Z - 20 DEC 2019 ETA OMAA 0800Z 10PAX

ALL TIME IN UTC

REQUIRED SERVICES & CLEARANCES IN OKBK:

- LANDING CLEARANCE AS REQUIRED
- MARSHALLING
- AIRCRAFT PARKING
- AIRCRAFT HANDLING
- PASSENGER HANDLING.
- LAVATORY SERVICES.
- FUEL.
- DRY ICE.
- CUSTOMS & IMMIGRATION.
- AIRCRAFT MVT

SHOULD YOU REQUIRE ANY FURTHER INFORMATION, PLEASE DO NOT HESITATE TO CONTACT US. THANK YOU,

SKYPLAN

C

Overfly Permit Request

ATTN: AVIATION FBO

DEAR OPS,

GULF JET REQUESTS YOU TO ARRANGE OVERLY PERMIT FOR THE FOLLOWING PVT FLIGHT:

OPERATOR	ABC JET
AIRCRAFT REGISTRATION	A1FBB
AIRCRAFT CALLSIGN	A1FBB
AIRCRAFT TYPE	BOMBARDIER GLOBAL G5000 (GL5T)
MTOW	92000 LBS
AOC	PVT FLT

FLIGHT SCHEDULE

20 DEC 2015 ETD OMAA 0400Z - 20 DEC 2015 ETA HECA 0730Z FERRY
20 DEC 2015 ETD HECA 0830Z - 20 DEC 2015 ETA OMAA 1030Z 10PAX

TIME IN UTC

REQUIRED OVERFLY CLEARANCES:

- QATAR
- BAHRAIN
- SAUDI ARABIA

SHOULD YOU REQUIRE ANY FURTHER INFORMATION, PLEASE DO NOT HESITATE TO CONTACT US. THANK YOU,

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THANK YOU