**REPORT**

# New International Airport of Cabinda (NAIC Project) - Angola

*Environmental and Social Impact Assessment - Chapter 18 - Unplanned Events*

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# 18.0 UNPLANNED EVENTS

This section describes the unplanned events that may occur during the construction and operations of the NAIC Project and the effects they may generate. Unplanned events are not expected to occur during the Project's normal construction and operational phase activities but are considered possible, although unlikely; therefore, their consequences, impacts and effects need to be identified and managed.

As the Project has not completed the design phase and this ESIA report has been prepared on the basis of the information available so far, this chapter provides an initial identification of potential unplanned events during construction and operation.

The Project is being designed based on the principle of preventing unplanned events to occur and will take into consideration lessons learnt from other projects. MoT and its designer will develop adequate engineering design solutions and operational procedures to avoid and minimise the level of risk in case of the unlikely occurrence of unplanned events.

This section provides an overview of the potential consequences related to a number of scenarios and non-routine operations during construction and operation, including those due to natural hazards and identify measures to be taken for their avoidance and, if this will not be possible, to mitigate their impacts.

## 18.1 Construction Phase

Based on WSP's initial screening of available Project information, possible unplanned events that may occur in the construction phase are:

- Traffic accidents;
- Fires;
- Damage to third-party assets; and
- Release of liquid fuel from tanks at the Project site.

These events represent a potential risk during construction although they may occur also during Project's operations. The likelihood of these events is considered higher in the construction phase and they are therefore considered in this document as potentially associated to construction activities although many of the control measures described could also apply during the operational phase of the Project.

### 18.1.1 Traffic Accidents

Accidents involving vehicles are among the most frequent causes of injury or death in the construction phase of virtually any projects, including infrastructure developments such as airports. The consequences of traffic accidents may affect both Project's workers when occurring at the construction site and communities living along the roads used by Project vehicles to access the construction areas.

Traffic accidents may happen during:

- Delivery of machinery, material, fuel and chemicals from where they are purchased, imported or distributed to the Project's site using public roads;
- Site workers commuting to their workplace using public roads; and
- Deliveries, services, waste management collections and project visitors, using public roads to move to or from the Project site.

The main causes responsible of traffic accidents are:

- Driver fatigue;
- driver behaviours and behaviours of other road users;
- inappropriate level of driving experience for the type of vehicles driven;
- road conditions;
- weather conditions;
- poor vehicle maintenance; and
- congestion in urban centres and traffic conditions.

Road safety will be a key concern of ASGC and the contractor that will be committed to adopt and implement the highest standards in terms of road safety.

The following are considered the possible effects of unpanned events due to road accidents during construction:

- Injury or mortality of communities' members;
- injury or mortality of Project workers;
- injury or mortality of livestock and impact on livelihoods;
- damage to structure and assets at the Project site;
- damage to structure and assets along transport routes and in community centres; and
- contamination of soil, water or other environmental components in case of an accident with release of hazardous material or fuel.

Chapters 10-12 (Impact Assessment) includes an assessment of impacts associated to traffic and identify relevant mitigations during normal operations. These potential impacts will be managed through a Traffic Management Plan which will be included in the set of Environmental and Social Management Plans (ESMPs) package for the Project. The plan will include measures on vehicle speed, restrictions to the routes used, training requirements for drivers including rules for the avoidance of drugs and alcohol and any other substance that may limit the ability to safe driving.

The plan will also include measures and safety initiatives to be shared with the local communities as part of the stakeholder engagement process to inform on traffic risks and safety aspects.

Major incidents inside the construction site and outside the project fence will be managed through the Emergency Preparedness and Response Plan (EPRP) that includes specific measures to deal with traffic accidents and considering traffic risks because of local road conditions and the presence of other projects under construction. The findings will be used to develop additional site-specific mitigations prior to the commencement of construction.

### 18.1.2 Fire and Explosion

There are multiple possible causes of fire at construction sites:

- Accidental ignition of dry vegetation or flammable material during certain operations involving hot work (e.g., welding, grinding and cutting);
- inappropriate human behaviour (e.g., cigarettes);
- inappropriate actions by third-party activities outside the construction sites;

- failure of electrical equipment and circuits; and
- lightning strikes.

Despite the risks of severe fires is considered limited, fires can spread across the construction site and cause impacts on workers and assets and on the environment.

The Project will be developed in a greenfield area with tree cover and vegetation that could be affected by fire. Stringent measures will need to be identified and enforced to minimise fire risks.

Fires can also impact local communities and their livelihood such as properties and local infrastructure, although these effects are considered unlikely due to the Project distance from the nearest communities.

Fire risk associated with Project activities will be minimised through the definition and enforcement of strict control measures, including the adoption of a “permit to work” system for hot works. Fire extinguishers and other fire protection systems will be disseminated across the different working areas and workers will be trained on first emergency. Smoking shall be strictly controlled by providing designated smoking areas for workers during all phases of the project, and other ignition sources (such as welding and cutting systems) will only be used under controlled conditions. Electrical equipment will be periodically checked to prevent issues.

In general, for the construction activities foreseen and the nature of site, the likelihood of fires occurring during construction is expected to be unlikely in terms of impacts on the environment and communities due to the distance of the project from community receptors. The EPRP will include a section defining fire response measures, procedures and roles and responsibilities for their implementation.

### 18.1.3 Damage to Third Party Assets

During the construction phase, the Contractor will use mobile construction machinery, such as excavators, dozers, and construction vehicles that may cause damage to third-party property.

The risk is considered low as those vehicles will mostly operate within the boundaries of the Project site and at a certain distance from external third-party assets, although external works could be required such as upgrade of access roads to site.

Third-party assets that may be adversely impacted by construction activities will be identified through pre-construction surveys and delineated through temporary fencing, to prevent accidental collisions or interactions. In case heavy equipment and machinery will be transported to the site (e.g., construction vehicles from the port of Cabinda to the site) and will cross communities or public roads outside the Project fence, pre-construction surveys will identify potential risks and measures to be further implemented through the Traffic Management Plan to be prepared as part of the ESMPs package. Example of mitigations include the use of convoys or escort vehicles, awareness campaigns at the communities interested, proper schedule of construction activities to limit disturbance of third party assets. With appropriate control measures and monitoring in place, the likelihood of damages to third party assets is considered unlikely and relevant specific response measures will be included in the EPRP.

### 18.1.4 Release of liquid fuel from tanks at the Project site

The Project’s construction phase will require the use of mobile equipment, power generation equipment and numerous vehicles. Although the exact Project’s needs in terms of construction vehicles will be defined during the detailed design and a full inventory of fuel storage has yet to be defined, oil, lubricants and diesel will be required at the site and fuel and hazardous materials storage facilities will be built at site.

Minor oil or chemical spillages may occur during vehicles refuelling and other construction activities. Potential larger spills may occur at the bulk fuel storage as result of tank rupture, human error or equipment failure during fuel transfer activities. The likelihood of fuel spills is considered medium to low in consideration of the level of

activity, the frequency of fuel transfer operations during construction and the type of fuel, volume spilled, location, and receptor sensitivity.

There are numerous industry good practice to prevent spills or minimise their consequences:

- Provision of roofed secondary containment for all fuel tanks and storage areas;
- use of specific fuel transportation and distribution vehicles to prevent leaks and spills;
- provision of automatic shut off systems to all pumps;
- provision of overfill protection devices to all tanks;
- avoidance of use of underground storage systems; and
- provision of emergency spill kits to all filling stations and storage areas.

Specific mitigations will be included in the Hazardous Material Management Plans that will specify storage requirements for hazardous materials, define refuelling procedures, and actions to be taken in the event of accidental release. The plan will also identify potential scenarios and require the development of relevant emergency response procedures for that will be included in the EPRP.

## 18.2 Operation Phase

While most unplanned events identified and discussed for the construction phase may be also relevant for the operation phase, some of them may be considered applicable also to Project operations and are discussed in this section.

It is noted that the airport will be designed and operated to comply with strict safety requirements such as ICAO and IATA standards. ICAO has published specific Standards and Recommended Practices (SARPs) for the safety, efficiency and regularity of international civil aviation, to address emergency response planning and coordination with various stakeholders of the aviation system in case of emergency. The Emergency Preparedness Response Plan shall be articulated considering the incidents that might occur at the aerodrome, at the heliport, those connected to the air traffic and those that might have impacts in the Area of Influence.

The airport operator should prepare the EPRP also considering the existing data of the old Cabinda airport, adding specific risk scenarios to address potentially catastrophic incidents such as aircraft crashes and fires and including a firefighting plan and training program, applicable to airport and aircraft emergencies.

The EPRP shall list and refer to all the international safety procedures mandatory for the aviation sector that will to be developed by the Project as part of the requirement to comply with ICAO and IATA standards. The following include a list of major risks that will have to be considered in the EPRP:

- Geophysical Hazards;
- deliberate attacks or damage to Project facilities;
- fire and explosion;
- cybersecurity;
- bomb threat;
- air crash; and
- epidemic.

### 18.2.1 Geophysical Hazards

Disasters caused by natural events need to be considered to avoid physical damages to structures, ensure safety and allow for business continuity. Natural hazards aspects have been addressed in the Climate Change Risk Assessment – Physical risks (Chapter 15) and consequently the Operator shall include in the EPRP a dedicated section with relevant measures to prevent and manage geophysical hazard risks. The two main hazards identified for the Project are extreme heat and storms and cyclones, also considered and assessed in the CCRA chapter.

### 18.2.2 Deliberate attacks or damage to Project facilities

Airports are susceptible areas to terrorist attacks. Whilst during the construction phase the main facilities would be temporary installations/buildings at site, in the operation there will be permanent buildings such the terminal and ancillary facilities. The same considerations and potential impacts identified for construction phase apply to this phase. Accordingly, the measures that have been considered for the construction phase of the Project can be also applicable during the Project operation. The involvement of a new entity (Sociedade Gestora de Aeroportos - SGA) will require a strong interaction with the national police system, security escorts in the Government of Cabinda or engagement with an external qualified security company. Necessary security provisions to prevent such events from occurring will be described in the EPRP for operation including the procedures to manage the consequences of those events.

### 18.2.3 Fire and explosion

There are various activities inside and outside the aerodrome that might be exposed to fire risks. Fire might be generated from aircraft inside the airport from the taxiways to the aprons, or when in the runway, from the vehicles inside the airport (buses, luggage-trucks, cars, mobile load bed and column lift, etc), during the refuelling operations. In addition, the fuel depot and other maintenance areas are also exposed to fire risks if not properly managed.

Combustible materials, electrical equipment, dangerous chemicals, and flammable liquids are airports' most frequent fire hazards. Combustible materials, such as cardboard boxes, paper, and plastic, can easily ignite in the presence of heat or flame. Electrical equipment and electronics, such as computers and air conditioning units can be overloaded and ignited due to electrical or thermal overloads. Hazardous chemicals, such as solvents and cleaning agents, can be ignited by a spark or heat source and flammable liquids, such as fuels and lubricants, can be easily ignited.

The EPRP shall consider such risks and identify detailed measures, especially in connection to the exposure of risks for workers, communities, airport passengers and to protect the environment.

### 18.2.4 Cybersecurity

Cybersecurity risks increased over time as airports become more and more reliant on software systems to manage crucial activities that can be attacked by hackers posing a cybersecurity threat. The airport will be equipped in case of systems blackouts with backups and emergency analogy systems to bring aircraft back to safety. The following include a list of actions to design and operate cybersecure airport:

- adopt an airport-wide approach to cybersecurity. As most systems are interconnected it is important the system as whole is well-secured and monitored;
- build cybersecurity in airport's system design from day one or even at planning stage;
- cybersecurity shall be well-governed and aligned with physical security and personnel, as attacks may be interconnected;
- establish crucial guidelines and procedures of monitoring and in case of cyberattack; and

- train relevant stakeholders on cybersecurity threats.

The EPRP shall propose measures to avoid cyberattack and to manage cyber security as needed. Guidance can be found using the ACRP Guidebook on Best Practices for Airport Cybersecurity, ACI Emergency Preparedness and Contingency Planning Handbook and ICAO's Aviation Cybersecurity Strategy.

### 18.2.5 Bomb threat

Airports and aircrafts are susceptible to terroristic attacks and connected risks. While bomb threats against aircraft or airports rarely translate into actual attacks, they are likely to cause disruption in the short term due to heightened aviation security measures at the affected airport, including potential evacuations of both staff and passengers from airport terminals and/or aircraft whilst checks for explosives are carried out. Indeed, while there are various motivations for making bomb threats, the resultant disruption is frequently the primary aim. ICAO and IATA have in place specific safety protocols that will have to be considered in the EPRP to ensure they are correctly developed and embedded into the airport operation.

### 18.2.6 Air crash

The airport is the place where the operations of aircraft take-off, landing and ground handling occur. Although in the overall airplane mission these phases are limited on time, according to statistical studies up to 32% of accidents occur in these phases. This percentage reaches 53% including the stages of final approach and initial climb[1]. Such accidents involve not only passengers and crews, but could impact a large area around airport including residents and commercial activities.

NAIC design has considered different protection zones based on the proximity to the runway to prevent risks from accidents along the aircraft routing. Additional measures and safety studies are yet to be developed to ensure the risks in the surrounding of the airport are properly mitigated. Specifically these studies will focus on:

- activities which, if involved by an air crash, may amplify the consequences of an accident and create damage to the environment (aboveground fuel depots, chemical plants, etc.): the presence of the future Refinery of Cabinda and of the Malongo Oil Complex will be considered as they might pose a risk of domino effect in case of explosion.
- Future urbanistic plan of the Government of Cabinda to avoid construction of buildings like schools, hospitals, high crowding centre, in proximity of the airport: for the existing schools in the radius of 2 km, considerations will be postponed to the second stage of the ESIA process when the ESIA might need to be revised based on the results of the additional baselines ongoing and once final design data will be available.

Given the limited information about the projects under development in the area, it is recommended to develop an airplane crash risk assessment to assess the risks for the surrounding of the airport. The study will serve to:

- Analyse the risk exposure and present and future traffic volumes at the airport;
- Carry out a study to determine accidents frequency from international databases using those more adaptable to NAIC;
- define the probability curve that best fit the accident location identified in the previous step;
- asses the consequences of air accidents in the different zones in the NAIC surroundings;
- define the factors combination causing an accident.

[1] From the 5th International Congress on Sustainability of road infrastructure (2012) - Risk Assessment Around Airport

### 18.2.7 Epidemic

Since the Covid-19 pandemic (2020) the aviation industry has been one of the first to embrace safety protocols by establishing mask mandates early on, social distancing protocols, and new sanitation standards within aircraft and airport facilities.

ICAO provides a clear and broad set of standards to manage communicable disease in Aviation[2] which is assumed will be considered to develop specific procedures at NAIC.

The EPRP will refer to such procedures to prevent risks and protect communities, employees and passengers.

[2] https://www.icao.int/safety/aviation-medicine/pages/healthrisks.aspx

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