BURO HAPPOLD

RESILIENT AIRPORTS

PANDEMIC RESPONSE: MAINTAINING OPERATIONS IN ANY EVENT

2020

THE KEY ISSUES

Maintaining operations during any event is one of the most important challenges facing airports.

Whatever form these challenges take - be it severe weather, climate and environmental impact or global health risks - knowing the infrastructure, systems and processes of the airport are resilient and robust will give a greater level of confidence to airport owners and operations.

In this document we explore our approach and response to the challenges of a pandemic.

CONTENTS

A PANDEMIC RESPONSE

As global travel recovers airports have the opportunity to explore flexible short- and long-term measures that continue to provide a safe and positive experience for all

THE ROAD TO RECOVERY AND PREPAREDNESS

History shows us the effects and impacts felt globally by the rapid transmission and spread of virus and disease at epidemic and pandemic scales.

No-one foresaw the colossal impacts of Covid-19 that swept so rapidly across the globe in 2020 and its ability to restrict and stop travel altogether. The aviation sector finds itself navigating a recovery that is slower than initially anticipated and remains uncertain, affected by external factors and guidance that seem likely to change quickly and frequently.

The inherent and ongoing risk of disease contagion and propagation is not new to the aviation industry and airports have a key role and responsibility in contagion control and risk mitigation.

Providing and maintaining the **quality and safety of the passenger journey** is at the heart of airport design and now even more important. Yet it has become a major challenge with many new and potentially intrusive measures in place.

Airports around the world have responded to the crisis, rapidly changing operational protocols and processes against a backdrop of significantly reduced demand. The introduction of **social distancing measures** requires airports to redesign internal and external spaces and as demand and travel patterns recover and change, airports will need agile and flexible strategies to accommodate these changes.

We have an opportunity to develop new ideas and provide solutions to improve resilience in airport design and operation. How we collectively approach the sector's recovery and **restore confidence in flying** from the current Covid-19 pandemic will give us valuable knowledge as to how airports can plan and adapt, affording a stronger level of operational resilience against future health related outbreaks.

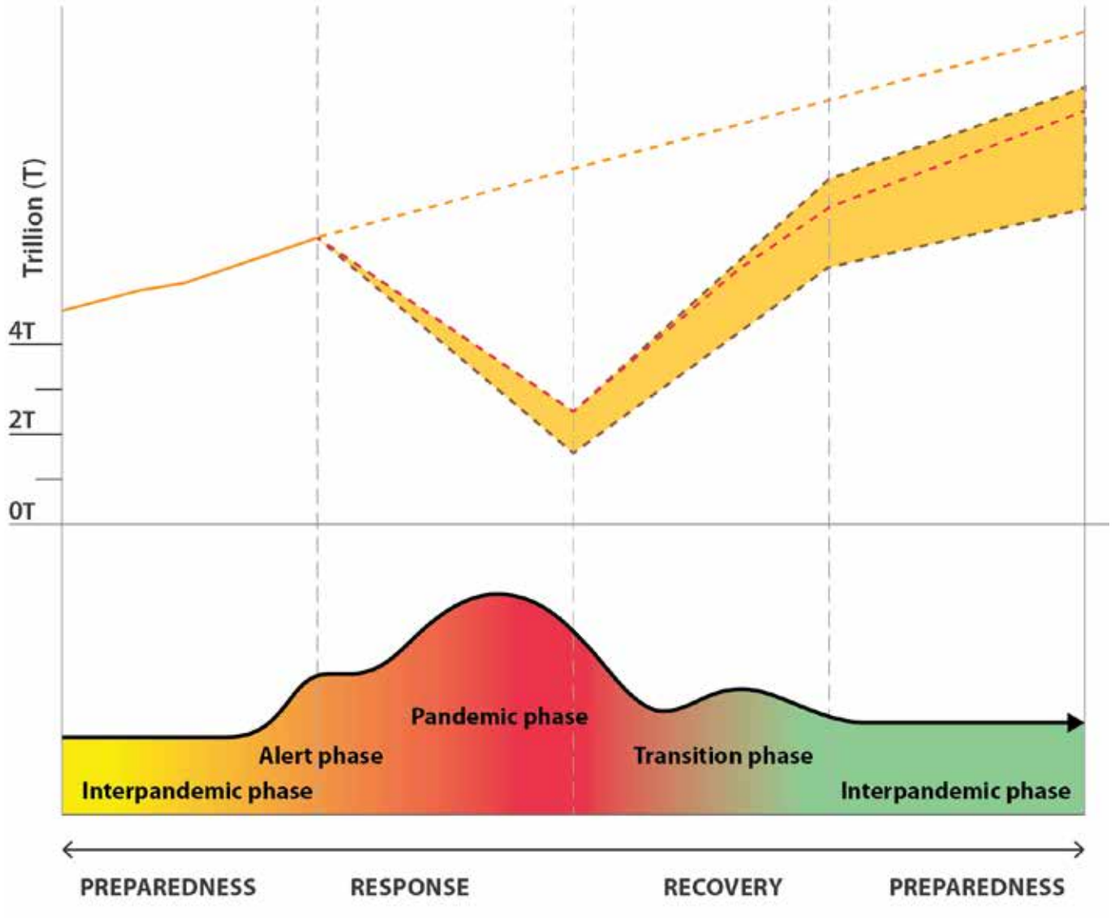
OUR APPROACH

It is now clear that a range of robust, easily deployable and effective response and preparedness strategies are required for the short term as well as the longer-term future. It is also apparent from our recent work that bespoke responses are needed to optimise site specific conditions and requirements.

Our approach is based on a multi-disciplinary, integrated and collaborative team of experts to provide a contiguous and comprehensive advisory service that considers a broad range of possible physical and operational interventions.

Working directly alongside client teams we can co-create and develop outcomes that takes on board operator expertise combined with our global experience and learning.

The aim is to develop and propose practical, scalable and cost-effective operational and infrastructure interventions and improvements to new and existing terminal facilities that help limit the spread of dangerous pathogens, establish a novel understanding of biosecurity management and ultimately help to restore traveller confidence.



RESPONSE AND RECOVERY STRATEGIES

Near term measures

Managing the immediate crisis response of a pandemic is driven by government regulations and international and local industry organisations (WHO, ICAO, IATA, ACI, EASA and others) who establish guidance and protocols to limit contagion, ensure the safety and protection of staff and passengers and help restore confidence. These are consistent around the world with some regional variances.

A clear pattern that has emerged from the COVID-19 pandemic and relevant to other airborne pathogens includes:

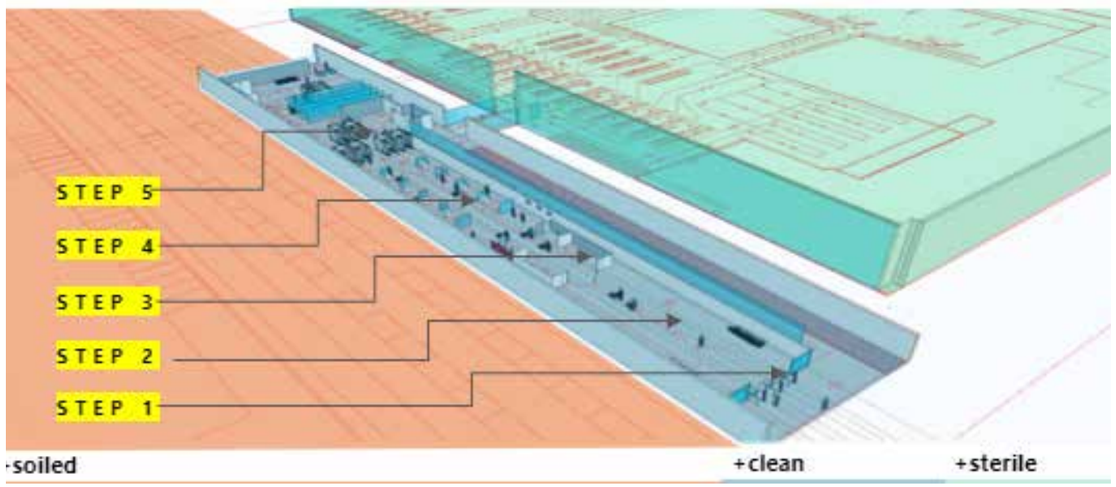
- The use of Personal Protective Equipment (PPE), in particular face masks.
- Physical distancing between people
- Contactless and touch-free operational environments
- Frequent and visible cleaning of surfaces and touch points
- Screening, health-checks and testing protocols

Most of the measures above are reasonably easy to implement, especially at lower levels of demand.

As demand increases, without careful design consideration, there can be significant pressure on available areas for processing, waiting and commercial facilities. The resulting impact on passenger flows would add disruption and delays to the passenger journey through the airport.

We can support our clients through the recovery phase, advising on current and future-proof terminal planning strategy including facility requirements, space provision and layouts optioneering using our flexible and interactive demand assessment tool.

This can help understand the impacts of rapidly changing passenger demand combined with preventative measures and altered operations. The online capability of the tool allows end-users to manipulate demand and process rate parameters to quickly and accurately predict issues and make tactical changes.



It is important that airport operators and management consider the full range of elements that contribute to the on-site contagion risk and how to control these. While it will likely never be possible to entirely ensure complete biosecurity for an airport terminal there is every chance that the risks can be significantly reduced by introducing comprehensive and integrated mitigation strategies that consider the wide and complex range of issues uniquely present at airports.

Long term measures

Airports will be compelled to consider their role in the control of infectious diseases much longer into the future and beyond the current crisis. Commercial aviation and airports remain the primary conduit for global connectivity and as a consequence also of spreading pathogens around the world.

The COVID-19 pandemic created a new set of operational constraints for airports to manage. Future airport terminal design will have to change materially and permanently. It will need to be open and flexible to accommodate unexpected changes in requirements, in response to a pandemic, not only to manage crises but also play an active and ongoing role in avoiding them.

Airports will need strategies in response to future likely events. These strategies could include:

- Provision of basic infrastructure like power and data to enable rapid deployment
- Possible re-purposing of existing infrastructure like car parks and forecourts to provide additional processing and buffer zones during times of crisis. These spaces can also serve to improve the passenger experience, allow for mitigation and control measures but also provide an opportunity for passenger amenity by providing retail and food and beverage facilities in a more flexible and temporary way.
- Becoming part of a series of safe clinical control zones. Areas that facilitate and manage the transition of passengers from an external uncontrolled environment to one that provides optimal levels of biosecurity in preparation for flight. We are learning from our colleagues who specialise in clinically controlled facilities and have developed operational, layout and equipment modification strategies that can help achieve this.

Building Services (MEP) Systems

The design and operation of building systems require specific attention as they manage the airflow, environmental control and conditioning of zones all of which can have a significant impact on the transmission of viruses.

The air handling systems for a terminal can play a major role by introducing zoning, filtration, sterilisation and fresh air intake strategies.

Traditional mechanical and public health systems would require assessments and possible modification.

Energy consumption and environmental impact remains as critical as before and will rely on an integrated and considered approach.

Our highly experienced MEP team have worked on many terminals of various scales and understand the airport terminal environment working in close collaboration with our airport planning and design experts.

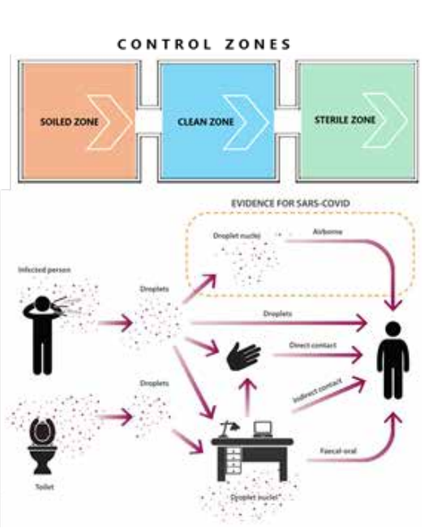
The role of technology

The introduction of contactless and touch free technologies in the passenger processing environment will form a key part of longer-term mitigation strategies.

Self-service, automated and biometric passenger technologies are well developed and have been proven effective. Accelerated adoption and standardisation across the industry is now inevitable. Airports will require ITC systems and processes that can accommodate these as well as readiness for future autonomous passenger and baggage processing technologies that could include the following:

- Off-site and pre-processing systems
- Passenger processing technologies
- Biometrics and identity verification
- Information and wayfinding
- Baggage handling systems
- Retail and vending
- Health control and monitoring systems
- Cleaning and sterilization systems

FEATURED PROJECT



CONFIDENTIAL NEW AIRPORT TERMINAL

Dates: 2020

Buro Happold were appointed to provide design guidance and recommendations for a proposed new terminal in relation to airport planning and MEP systems in response to the COVID-19 pandemic.

The purpose of the study was to propose practical and cost-effective operational and infrastructure changes to the original design to help limit the spread of a virus, establish a novel understanding of biosecurity management and help to restore traveller confidence.

The study included a comprehensive baseline review of international and regional guidance and best practice (WHO, ICAO, IATA, ACI, EASA and others) to inform a variety of operational and physical interventions in the terminal. The team analysed the various approaches and short-term measures being taken at airports around the world and the early lessons learnt.

The study also considered the various stages of a pandemic from immediate crisis response to longer term resilience and readiness strategies. The rapid and unpredictable evolution of the pandemic required a bespoke response strategy and frequently updated tactical approach.

A key part of this assignment was a detailed review of the architectural layouts, system design and passenger processes. The study culminated in a series of proposed physical, operational and systems interventions for the design team to consider and incorporate. These included strategies to modify and re-purpose existing facilities, establishing clinical control zones, passenger flows and processing while maintaining throughput capacities and quality passenger experience. The introduction and accelerated uptake of new equipment and technologies for contact free passenger and baggage processing, air handling, cleaning & sterilisation and tracking was also proposed. Away from passenger areas, recommendations relating to goods and waste handling, staff and security systems, retail and commercial areas were also provided.

The team also recommended a number of design and operational interventions to the MEP systems (based on recognised best practice from ASHRAE, CIBSE, REHVA and the CDC). The purpose of these measures were to ensure the integrity of the control zones, as well as prevent the building's systems from spreading the virus within the control zones and provide the required infrastructure to support the future resilience strategies.

KEY CONTACTS

POSITION / SPECIALISM
Director - Airport Planning

QUALIFICATIONS
Bachelor of Architecture (Honours)

MEMBERSHIPS
South African Institute for Architects (SAIA)

BURO HAPPOLD
2018 - present

Pieter Coetzee B.Arch (Hons)

Pieter is a qualified architect with over 18 years of experience in airport planning and design, commercial, transport and residential projects. He has worked on airport projects throughout the world and has extensive expertise in master planning, terminal, airfield and airport systems planning.

His particular interest and expertise is on all aspects of airport project planning and design, ranging from strategic advisory roles to physical planning and design. As an architect he has special interest in integrated terminal and airfield design. He is particularly passionate about application of technology, process and design innovation. He also has significant experience and interest in collaborating with leading international architects on large international airport projects.

POSITION / SPECIALISM
Associate Airport Planner

QUALIFICATIONS
Diploma in Architecture

MEMBERSHIPS
RIBA, ARB, Architects Professional Association

BURO HAPPOLD
2019 - present

Tiziana Ambrosino MArch RIBA

Tiziana has 16 years of architectural and engineering design and planning experience. Specialising in the field of airport planning she has worked on airports in the UK, Europe, USA, the Middle East, and South and Far Eastern Asia.

Tiziana's blend of experience means that she is a subject matter expert both in the airport planning process and in the constraints of the built environment. This detailed understanding gives her the ability to provide holistic solutions and communicate clearly with all stakeholders.

POSITION / SPECIALISM
Lead Airport Planner

QUALIFICATIONS
Bachelors in Architecture, Master in City Planning

MEMBERSHIPS
Council of Architecture (CA), India, Institute Town Planners Indian (ITPI) (Life),

BURO HAPPOLD
2019 - present

Yadukul Bhuvanendran BArch MCP CA AITP

Yadukul has over 16 years of experience in airport planning, urban planning, architecture, and project management in India and internationally. He has experience of project conceptualization, planning, consensus building, designing and developing feasible interventions.

Over the past 12 years, Yadukul has specialised in airports. He has particular expertise in the design and planning of airfield, terminal, and landside facilities. He is also able to draw on his architectural experience of preparing and evaluating large, complex building designs including passenger and cargo terminals, baggage handling, VIP facilities and lounges.

POSITION / SPECIALISM
Associate - Building Services

QUALIFICATIONS
MEng (Hons) Mechanical Engineering CEng

MEMBERSHIPS
Member of Chartered Institute of Building Services Engineers

BURO HAPPOLD
2005 - present

Richard Budd MEng (Hons) CEng

Richard is passionate about sustainable design and developing high quality projects. He has experience in low-energy building design, including implementation of BREEAM and LEED environmental rating systems into new-build projects.

A mechanical engineer by training, he has a wide ranging knowledge of building services as well as experience with many of the specialist engineering disciplines. Richard has taken the role of lead mechanical engineer for a number of international airport projects, as well as taking an active role in the engineering and development process.

INTEGRATED MULTIDISCIPLINARY ENGINEERING

SERVICES

Buro Happold delivers world class engineering across a range of specialisms spanning buildings and cities. We combine creativity with solid technical skills and an awareness of the key drivers that shape projects in the aviation sector.

- Acoustics
- Airport Planning
- Air Quality
- Asset Management
- Bridges and Civil Structures
- Building Services Engineering (MEP)
- Coastal and Marine
- Computational Analysis
- Drainage and Storm Water Management
- Earthworks
- Economic Development
- Economic Infrastructure
- Environmental Consultancy
- Environmental Impact Assessments

- Facade Engineering
- Fire Engineering
- Flood Risk
- Geoenvironmental
- Geotechnical
- Highway Engineering
- Inclusive Design
- Integrated Development Planning
- IT Communications and Control
- Lighting
- Organisational Development
- People Movement
- Procurement
- Project Management
- Regional Planning
- Security Engineering
- SMART Space
- Strategic Infrastructure
- Structural Engineering
- Sustainability
- Transport Planning
- Utilities Engineering
- Waste Management
- Water Management

BURO HAPPOLD

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