



# **Airport Terminal Engineering Systems**

## **Course: Passenger Boarding Bridges, 400Hz GPU and PCA**



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### **Introduction:**

Airport terminal engineering systems, covering passenger boarding bridges, 400Hz GPU and PCA, is a 1-week course for airport engineering, gate equipment and terminal building services managers, ending with a Gate Equipment Availability and APU Reduction Plan for a case terminal. Terminals lose on-time departures and burn avoidable fuel when bridges fail to dock, ground power trips, conditioned air runs weak and aircraft fall back on auxiliary power units. Nominees already manage or contract the maintenance of gate and terminal equipment and learn through inspection walkthroughs of stand equipment records. CoreConcept Training Center delivers this airport terminal engineering systems course.

### **Course Objectives:**

- Map the gate equipment set at a contact stand, its interfaces and the responsibility split between airport, airline, handler and maintainer
- Inspect passenger boarding bridge structures, drives, auto-level, auto-docking and safety interlocks against inspection criteria
- Specify and maintain 400Hz ground power and pre-conditioned air units so that aircraft can shut down auxiliary power units on stand
- Supervise visual docking guidance, travelators and people movers and link their alarms to the terminal building management system
- Set availability measures, maintainer service levels and fault escalation rules for gate and terminal equipment
- Build a Gate Equipment Availability and APU Reduction Plan for a case terminal

### **Target Audience:**

- Managers responsible for passenger boarding bridge fleets and their maintenance contracts
  - Engineering leads accountable for 400Hz ground power, pre-conditioned air and stand electrical supply
  - Terminal building services managers responsible for travelators, people movers and the building management system
  - Asset managers who plan renewal, retrofit and spares for contact stand equipment
  - Environment and energy leads who own auxiliary power unit reduction targets at the stand
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## **Course Outline:**

### **Day 1: Contact Stand Equipment Landscape and Availability Baseline**

- Contact Stand Equipment Inventory From Rotunda to Docking Display
- Airport, Airline, Handler and Maintainer Interface Responsibility Matrix
- Apron Drive, Nose Loader and Fixed Bridge Type Comparison
- Auxiliary Power Unit Use on Stand and Its Fuel Cost
- Gate Equipment Baseline From Fault Logs and Downtime Records

### **Day 2: Boarding Bridge, Ground Power and Conditioned Air Architecture**

- Rotunda, Telescopic Tunnel, Cab and Canopy Load Paths
- Drive Column Wheels, Lift Columns and Cab Rotation Mechanics
- 400Hz Solid-State Frequency Converter and Cable Reel Layout
- Pre-Conditioned Air Unit Cooling Capacity and Hose Sizing
- Visual Docking Guidance Sensor Logic and Stop Position Display

### **Day 3: Inspection, Maintenance and Operating Routines at the Gate**

- Boarding Bridge Daily Check and Planned Maintenance Schedule
- Auto-Level Shoe, Auto-Docking Sensors and Interlock Function Tests
- Ground Power Output Voltage, Frequency and Earth Fault Checks
- Pre-Conditioned Air Filter, Coil and Discharge Temperature Checks
- Travelator Pallet, Handrail and Comb Plate Inspection Routine

### **Day 4: Failure Modes, Service Levels and Building Management Integration**

- Bridge Collapse, Cab Drift and Aircraft Contact Incident Causes
- Ground Power Trip and Conditioned Air Shortfall Root Cause Analysis
- Building Management System Alarm Mapping for Gate Equipment
- Availability, MTBF and MTTR Measures in Maintainer Service Levels
- APU Shutdown Rules, Exemptions and Stand Compliance Monitoring

### **Day 5: Inspection Walkthrough and Gate Equipment Availability and APU Reduction Plan**

- Case Terminal Walkthrough of Bridge, GPU and PCA Records
  - Case Defect Ranking by Safety and Departure Delay Impact
  - Case Service Level Gap Review Against Maintainer Reports
  - Case APU Use Estimate From Stand Equipment Availability
  - Gate Equipment Availability and APU Reduction Plan Completion
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## **Skills You Will Gain:**

- Boarding Bridge Inspection
- Ground Power Fault Diagnosis
- Conditioned Air Performance Checking
- Docking Guidance Supervision
- Building Management Alarm Mapping
- Maintainer Service Level Setting
- Gate Equipment Availability Analysis
- APU Reduction Planning

## **Why Attend This Course:**

- Deliver a Gate Equipment Availability and APU Reduction Plan to the head of airport engineering and the terminal asset owner for approval
- Decide when to withdraw a bridge from service, escalate a maintainer or enforce APU shutdown using defined criteria
- Avoid aircraft contact damage, delayed boarding and avoidable fuel burn caused by unavailable stand equipment
- Coach bridge operators, technicians and contract supervisors with the daily check sheet, interlock test list and alarm map

## **Conclusion:**

Back at work, the participant presents the Gate Equipment Availability and APU Reduction Plan to the head of airport engineering, the terminal asset owner and airline station representatives. They use it to agree maintenance priorities for bridges, ground power and conditioned air, set service levels for maintainers and confirm the stands where APU shutdown rules apply. After the first season under the plan, the engineering unit should compare equipment availability, docking faults, ground power trips and APU running time with the plan and revise the measures that fell short.

## **Frequently Asked Questions FAQ:**

### **What should participants know before an airport terminal engineering systems course?**

Participants should already manage, contract or maintain boarding bridges, ground power, conditioned air or terminal building services. Bringing anonymised fault logs, maintainer reports or stand equipment records helps during the walkthrough day.

## **How does an airport terminal engineering systems course differ from a baggage system or airport operations course?**

This course centres on equipment at the contact stand and in the terminal: boarding bridges, ground power, conditioned air, docking guidance and people movers. Baggage system courses cover sorters and screening, while airport operations courses cover turnarounds, stand allocation and passenger flow.

## **Why do airport terminal engineering systems teams link 400Hz GPU and PCA to APU reduction?**

An aircraft can shut down its auxiliary power unit on stand only when ground power and conditioned air are available and adequate. Reliable GPU and PCA therefore cut fuel burn, noise and emissions at the gate.

## **What do participants take back from the airport terminal engineering systems course?**

Participants take back a Gate Equipment Availability and APU Reduction Plan with a defect ranking, interlock test list, building management alarm map, maintainer service levels and APU shutdown rules they can adapt to their own terminal.

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