Optimizing Fuel, Cargo, and Passenger Payload on Long Haul Flights

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Typical Dispatch Process

SOC

- 4 Hr. — *Preliminary Weight & Balance*
- 4 Hr. — *Preliminary Flight Plan*
- 1 Hr — *Final Weight & Balance*
- 1 Hr. — *Final Flight Plan*

Airport

- 2 Hr. — *Passenger Check-In*
- 1 Hr. — *Cargo Load*
- 1 Hr. — *Fuel Load*
- 0.5 Hr. — *Baggage Load*
- 0.5 Hr. — *Final Close-Out*

Problem Areas!

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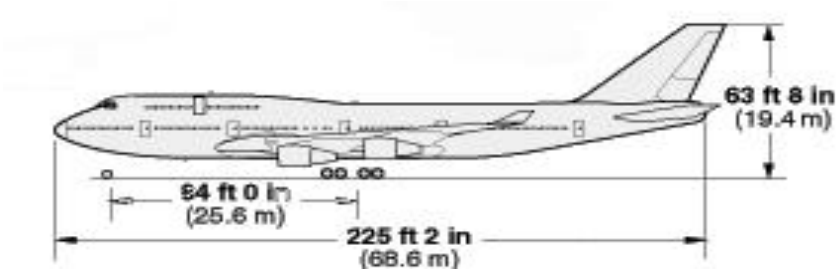
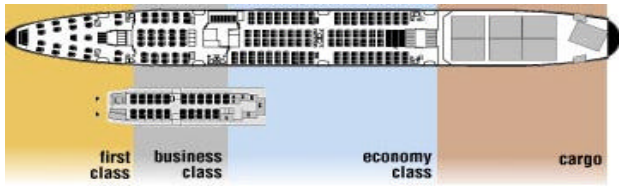
What is a Combi Operation?





Typical B-747 Combi

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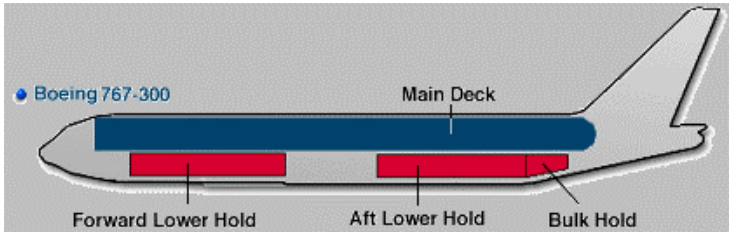
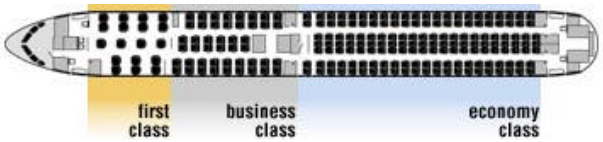
B-767 Combi





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Lan Chile B-767-300-ER Combi

- *On an Eight-Hour Flight ...*
  - *If a typical airline carries 200 pax …*
    - *20 tonnes of pax + baggage*
  - *5 tonnes of cargo will be typical*
  - *10-15 tonnes will be maximum*
  - *At Lan Chile, we carry 22 tonnes!*
    - *SCL-MIA equivalent of another 70 passengers' revenue!!*
  - *We are carrying up to 42 tonnes payload!*
    - *And our goal is 44!!*
  - *A B-767-300 F can carry 50 tonnes*
    - *By saving the weights of the passenger compartment!*

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Limitations on an Aircraft

- *Any aircraft may have different limits affecting payload*
  - ***MTOW** - Maximum Take-Off Weight*
    - *More limiting as flights get longer.*
    - *Controlled by cutting fuel.*
  - ***MLW** - Maximum Landing Weight*
    - *Structural issue.*
    - *More limiting as flights get shorter.*
    - *Controlled by cutting fuel, cutting DOW, Payload.*
  - ***MZFW** - Maximum Zero Fuel Weight*
    - *DOW(Dry Operating Weight) + Payload.*
    - *More limiting as flights get optimized on payload, fuel.*
    - *Controlled by cutting DOW, Payload.*
  - ***DOW** - Dry Operating Weight*
    - *The weight of the aircraft.*
    - *Controlled by removing stuff.*

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Interesting Corollaries

- *In an optimized operation, each aircraft will have a "natural" ideal stage length for a given airline, based on cargo densities, tariffs, etc.*
  - *You know you are at it if the limiting factors on a given aircraft vary by flight.*
  - *For instance, if you are either density or MTOW limited, there is no valid benefit from Yield Management of Cargo with Pax.*
- *Payload Space*
  - *A problem with low LF flights, low density cargo (courier, computers, etc.).*
- *Just because you are constrained by these limits, you can't necessarily reach any of them!*
- *You are always transporting "holes".*
  - *Due to suboptimal coordination.*

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So How Do You Optimize Payload?

- *Effective Revenue Management of passenger traffic.*
- *Effective Revenue Management of cargo traffic.*
- *Effective control of passenger check-in, luggage, carry-on.*
- *Managing cargo density across multiple flights, connections.*
  - *Also using the Bulk Hold when possible.*
- *Using the right aircraft!*
  - *All are different!!*

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So How Do You Optimize Fuel?

- *Careful monitoring of all flights and flight logs, annotated flight plans to reduce variance.*
- *Destination-based FOD (Fuel Over Destination) reduction.*
- *Developing an Enroute Diversion policy to deal with contingencies.*
- *Sensitizing Pilots to how to make and save money while actually enhancing safety!*

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So How Do You Eliminate Holes?

- *Coordination, Coordination, Coordination!!!*
- *Adding Payload Coordination function to SOC.*
- *Start Planning Critical Flights early in the day.*
- *Run extra flight plans.*
- *Have Standby Cargo, Standby Fuel to load after closeout.*
- *Daily Payload Problems review.*
- *Motivational Company-Wide communications.*

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Lan Chile Results

- *Total gains of over 4 tonnes!*
- *DOW - 92,400*
  - *We cut it by 500 kilos!*
- *SCL-MIA Fuel Burn 44,000, Block Fuel 51,000*
  - *We cut Block Fuel - i.e. FOD - by 2,000!*
- *"Holes"*
  - *We cut empty space by 1,500!*

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