757 freight conversion details

The 757 freight conversion programme launched by Boeing provides an aircraft with a net payload that offers DC-8-55, 707 and 727-200F operators capacity for growth and efficiency of cash operating costs. Payload specification details are described.

Following Boeing's purchase of 34 of British Airways' 757s for conversion and lease to DHL, details have emerged of the aircraft's payload specification.

The maximum zero fuel (MZFW) and operating empty weights of the 757SF are almost identical to Boeing's factory-built 757 freighter. The 757SF's maximum structural payload is therefore also equal to the factory aircraft.

In addition to leasing the aircraft Boeing will provide DHL with maintenance services. BA's aircraft were some of the first 757s to be delivered, starting from 1982. These are low gross weight models powered by the unique RB211-535C engine.

The gross weight of the RB211-535C powered versions went up to 240,000lbs, while the later -535E4 and PW2000 engines allow gross weights to 255,000lbs.

The 757SF has a maximum structural payload of 113,550lbs and after deducting weight for crew and equipment will be 86,980lbs. The aircraft can accommodate 15 125-inch x 88-inch containers. These are the same as those used by the 727 and DC-8s.

The tare weight of each container is about 250lbs and has an internal volume of 440 cubic feet. The total available container volume is therefore 6,600 cubic feet, the tare weight 3,750lbs. Net structural payload will therefore be 83,230lbs.

This compares with 55,300lbs for the 727-200, which uses 12 of the containers. The 757 is pitched as a replacement for the 727-200. The 757SF will also offer airlines a replacement candidate for the DC-8-55 and 707. These can each hold 13 of the same containers and have net structural payloads of 92,530lbs and 90,420lbs, respectively.

The 757 therefore has more available volume, but a smaller structural payload. The DC-8-55 and 707 have maximum packing densities of more than 15lbs per cubic foot for their containerised volumes. This is higher than most types of carriage need and illustrates that the DC-8 and 707 have high MZFWs in relation to their size.

The 757 has a maximum packing density of 12.60lbs per cubic foot, which is also in excess of the needs of most types of freight. The aircraft does not therefore lack structural payload capability.

At a small package packing density of 7.0lbs per cubic foot, the 727's net structural payload is 38,472lbs. The DC-8-55 and 707 have payloads of 41,678lbs and the 757SF 46,200lbs. The 757 can therefore offer growth capacity for operators of all three older types.

Although 757 values have fallen, the obstacle of acquiring used 757s and making them available for freight service is beyond the financial capability of most operators. Boeing Capital Corp has underwritten the transaction.

Depending on the age and condition of these aircraft, the current market value of these 757s is $16–22 million. John Keitz of BK Associates gives an appraised value of $18.55 million for a 1982 build non-ETOPS standard-weight 757 and $22.65 million for a 1984 build. He then suggests that this value would need to be discounted by another $3.5–4 million for 757s, with the C version engines.

Keitz believes the 757 will make an excellent freighter, but the acquisition cost for a used 757 will need to come down to about $9-10 million before the average freight carrier considers replacing its 727s with 757s. Given that the average cost of a 757 freighter conversion is another $7–9 million, in addition to the acquisition cost, the lease arrangement created for DHL is a more affordable option at this stage.

Israel Aircraft Industries and Singapore Technologies Aerospace, part of Boeing's Global Partnership network for modification and engineering facilities, will be the primary subcontracting facilities on this programme.

757SF, DC-8-55, 707-320C & 727-200F PAYLOAD SPECIFICATIONS

Aircraft type	757SF	DC-8-55	707-320C	727-200
Maximum zero fuel weight (lbs)	200,000	224,000	229,940	150,000
Operating empty weights (lbs) weight (lbs)	112,490	127,450	135,500	90,930
Net structural payload (lbs)	83,230	92,530	90,420	55,300
Number of containers (125 x 88 inches)	15	13	13	12
Volumetric payload (7.olbs per cubic foot)	46,200	41,678	41,678	38,472

Hamilton STC due

Hamilton Aviation of Arizona is due to receive the supplemental type certificate (STC) for its long awaited 727 conversion in November 1999.

Hamilton Aviation says the conversion will provide a freight conversion free of airworthiness directives (ADs). There have been several issues affecting the 727F. One was the recent AD for each existing conversion STC which limited floor loading to a low level. Another AD, number 98-11-03 and known as the stealth AD, relates to structurally significant items (SSIs). This stipulates that any structural modification made will require a supplemental structural inspection programme (SSIP) to be developed that will monitor the whole of the fleet with that modification. This then raises maintenance costs through more inspections.

An example of a SSI is a freight conversion. Another is a modification that will provide a fix for floor limit loading. SSIPs will then have to be devised for these fixes.

Hamilton Aviation's STC has used a finite element modelling (FEM) system to make accurate assessment of structural loads. The FEM can develop SSIPs with the longest possible inspection intervals and so minimise maintenance costs. Hamilton's conversion STC also avoids floor loading limitation issues and permits 8,000lbs per pallet position.

Hamilton Aviation says its STC will guarantee that the aircraft will be free of all issues the FAA has made so far with the 727. Hamilton already has 22 firm orders for the conversion and first deliveries are due when the STC is issued. AC