

The DC-10 has always been regarded as a dependable investment aircraft. The industry has confidence in the DC-10 because of its history of physical durability and stable residual values. Is the DC-10 still a strong investment prospect, or has the unthinkable happened, and the aircraft become too risky to invest in?

Is the DC-10 still a solid investment?

Most investors would say the DC-10 is basically a good prospect. However examination of financial details warrants careful consideration, and profits can sometimes be hard to make. Most investors would convert DC-10-30s to freighters.

An investor will use lease rentals to fund the debt and equity in the aircraft. Equity is normally provided at high cost by an investor, requiring a return, while debt is only partially amortised by lease rentals over a each lease term of five to seven years. The future residual value at the end of each lease term must be more than the outstanding debt for a profit to be made. The DC-10's history of reliable residual values means the prospect of making a profit is likely. Nevertheless, even DC-10-30 values have experienced a rollercoaster ride before.

Lease rentals are determined by the aircraft's relative operating and economic performance, as well as demand for aircraft, and are independent of the lessor's acquisition cost. It is therefore crucial to minimise acquisition cost and so the equity and debt that must be financed by the lease rentals. "Lease rentals for DC-10-30 freighters are now in the \$300,000 per month region, while passenger aircraft are achieving about \$250,000 per month," explains Stephen Rimmer, director at Curtis and Co.

"The build cost of a 1970s aircraft converted to freighter will be in the region of \$25 million, while the projected residual value for such an aircraft in five years is about \$17 million." These basic parameters give investors most of the

criteria for making an investment decision. Another factor will be the cost of debt and equity.

Aircraft can be re-financed after each lease term, their values determined by independent appraisers. The financing structures most investors depend on mean only aircraft that have been built in the 1970s or early 1980s have values low enough to justify the investment. The total working life of the DC-10 could be as much as 45 years, meaning aircraft could operate for another 25 years, five 5-year lease terms. "The commitment by FedEx and McDonnell Douglas to the DC-10-10 shows the aircraft has at least another 20 years of working life left, and that is for aircraft that are already 25 years old," says Desmond McEvaddy, director at Omega Air. "It is reasonable to assume the same life for all other DC-10s."

A profit can be made at the end of the final lease term from the scrap value of the aircraft's major components. "The DC-10-30 should have good prospects in this respect," explains Rimmer, "since its engines are also used by the A300 and 747-200."

MD-11 looms

The DC-10 now faces competition in the secondary market for the first time. The larger and more capable MD-11 is entering the market early and could overshadow the DC-10. This already happened in 1996 when Korean and American converted a large number of their MD-11s prematurely. A portion of these aircraft were sold to FedEx.



FedEx's commitment to the DC-10 means other operators can rely on a 45 year life. Investors can expect another 25 years from aircraft converted today.

With the MD-11 being overshadowed by the 777 and A340 in the passenger role, the MD-11 is being forced into a secondary freight role. Despite having admirable features as a freighter, the MD-11 is still young and few airlines can justify acquiring them for freight conversion. The number of MD-11s that passenger operators want to off-load far exceeds demand by freight carriers. This factor could then depress the DC-10-30 market.

"The DC-10 market has dropped in the Asia Pacific," explains Frank Price, managing director at Federal Express



Although DC-10 values have always held strong, the increasing availability of MD-11s will soften the DC-10 market. This is the first real threat to the DC-10's stability.

Aviation Services (Feasi). "Most have now been replaced by new aircraft." British Airways has agreed to sell Curtis & Co all its DC-10-30s and it is believed roles have already been decided for the aircraft. "The MD-11 is slowly taking over as a freighter," claims Price, "and this is making DC-10-30 values drop. One example is the relatively young DC-10-30s Varig is offering. In just a few weeks the asking price has reduced from \$22 million to \$17 million."

The MD-11s returned to Boeing by Garuda were leased to VASP. This deal then meant VASP no longer required Varig's DC-10-30s, leaving it with the problem of finding a buyer for its aircraft. VASP also managed to get lower lease rentals for the MD-11s than Garuda had paid. Malaysian Airlines has returned its MD-11s to World Airways. As a consequence the softening of the MD-11 market is overshadowing the DC-10-30. FedEx has just concluded a deal with Swissair to take all of its 20 MD-11s, eight spare engines and two simulators for \$800 million.

DC-10 acquisition

An investor will also have to consider purchase cost, maintenance work and modifications. Modifications are expensive, since they usually involve conversion from passenger to freighter and often include Stage 3 modifications. The plus side of the high cost conversion to freighter is that the process lengthens the aircraft's life. This then improves its residual value prospects at the end of subsequent lease terms, allowing outstanding debt to be covered and leaving a profit.

Investors now have two choices with the DC-10. The first is converting the aircraft to freighter. The second, which only applies to a limited number of aircraft, is to lease the aircraft as a high-density passenger aircraft to inclusive-tour operators.

The -30 series is now pivotal to the used DC-10 market. It looks almost certain that FedEx will eventually acquire all remaining -10s.

The JT9D-powered -40 series fleet has changed shape in the past year, with Omega Air in Ireland committing to take all of Japan Airlines' fleet of aircraft. Omega Air will install the centre main landing gear in the aircraft. "Challengair of Miami will lease five aircraft from us,

and has taken options on another three," says Desmond McEvaddy, director at Omega Air.

The other 20 DC-10-40s remain in service with Northwest Airlines. This leaves only -30s for investors to consider. The DC-10-30 is definitely most attractive as a freighter but there is still a risk with its market value.

As Price has mentioned, -30 market values are coming under pressure from the MD-11. Although the MD-11 is young and expensive, it is an attractive alternative for airlines that are able to use its full capability and achieve high enough utilisation. Market values for 1970s-built DC-10-30s could be as low as \$8-\$12 million although this will depend on maintenance status.

The number of DC-10-30s is now diminishing since most US, European and Asia Pacific first-tier operators have disposed of their aircraft, meaning there are less aircraft to choose from. The majority of aircraft that remain with first-tier operators are in South America, Africa and Canada, and many of these aircraft are younger and have higher market values.

The only major US and European operators with DC-10-30s unsold are Northwest, Canadian, Continental and Iberia.

DC-10-30 CONVERTED FREIGHTER BUILD COST

Item	\$ (millions)
Aircraft purchase (late 1970s or early 1980s-build aircraft)	8.0-12.0
Freighter conversion	8.5
D-check plus associated component repair (45,000 man-hours @ \$50 plus \$675,000 materials)	3.0
Two average engine shop visits	3.0
Landing gear exchange	0.3
APU shop visit	0.2
Total	23.0-27.0
Potential lease rate	\$300,000 per month
<i>Items not included: Tyre, wheel and brake replacements, LRU exchanges and repair. Also, possible avionics and specification weight upgrades.</i>	

DC-10-30 INCLUSIVE-TOUR BUILD COST

Item	\$ (millions)
Aircraft purchase (late 1970s/early 1980s-build aircraft)	8.0-12.0
Extended C-check	0.4
One average engine shop visit	1.5
Landing gear exchange	0.3
APU shop visit	0.2
Total	10.4-14.4
Potential lease rate	\$250,000 per month
<i>Items not included: Tyre, wheel and brake replacements, LRU exchanges and repair. Also, possible avionics and specification weight upgrades.</i>	

Aircraft status

Before buying an aircraft, several other features should be considered including the aircraft's flightdeck configuration. Not all DC-10s were built to the same specification, and indeed there are many built to particular configurations of gross weight, fuel volume, engine thrust and flightdeck.

As an example, the DC-10 has several flightdeck configurations. These are the ATLAS (which include Air Afrique, Finnair, Viasa and Garuda aircraft, as well as the Air France, Lufthansa, Alitalia and Sabena aircraft), KSSU (KLM, Swissair, SAS and UTA aircraft), as well as American and United, Laker, Continental, Northwest fleets. The major differences between each category are the combinations of vertical and round engine instruments, and autopilot and navigation options. Buyers of used aircraft have only a limited choice of particular configurations available.

Avionics will also have been upgraded or installed since the aircraft was delivered new. Mandatory upgrades may

have to be made, and this can cost several \$100,000.

What may be important to investors hoping to use their aircraft in a passenger role is the general specification of the cabin. This includes the cabin class configuration, the type of in-flight entertainment equipment installed and the presence of underfloor galleys.

Aircraft may have had original specification weight upgrades made. These can only be made by the previous owner having acquired the service bulletins from the original equipment manufacturer. One pitfall for a buyer is that the weight upgrades may not have been fully paid for and a buyer can become liable for payment. Upgrades cost \$35 per lb of weight improvement.

Build considerations

The worst possible case of an aircraft's maintenance status should be considered. A D-check and other airframe and related component maintenance could cost as much as \$3 million. This figure derives from 42,000-48,000 man-

hours at \$50/hour and a materials bill of about \$675,000. This is representative for a mature aircraft.

A D-check will be necessary if the aircraft is being converted to a freighter. The D-check interval in most cases is about five years. It would also make it easier to assess reserves for the next lease term.

Freighter conversion has a list price of about \$10 million, although individual deals get discounts. A budget of \$8.5 million could be expected although this might be partially offset by the sale of interior equipment. With the backlog of conversions for DC-10s and MD-11s having grown in the past year the availability of conversion slots has diminished. This may force investors to seek temporary alternative uses for aircraft they can acquire now in order to spread their investment costs.

One maintenance consideration to be aware of is that the aircraft may have come from an operator which was entitled to perform a percentage of structural samplings because of its extensive DC-10 experience. A new lessor and operator is unlikely to be granted the same dispensations for maintenance and the level of structural samplings could rise to 100% of all inspections for every aircraft. This itself could raise the man-hours above that quoted above, and increase both build cost and on-going maintenance costs.

There is not to be the same D-check requirement for an aircraft that will initially be leased out as a passenger aircraft but it would almost certainly require some cabin work. The accompanying check is more likely to be an extended C-check.

The aircraft's Corrosion Prevention and Control Programme (CPCP) status should also be analysed. Consideration should be given to threshold at which the CPCP becomes introduced into the maintenance schedule.

Removal intervals for landing gears are between five and ten years. Landing gear repairs are usually taken care of by exchange programmes which can cost up to \$300,000 per set.

The nose and outer main landing gears on the DC-10 have 100% interchangeability. This eases the problem of sourcing spare sets. The centre main gear used by the -30 and -40 series will still have to be found. The wheel and tyre sizes and pressures vary between DC-10 variants.

The DC-10 uses the Allied Signal TSCP700 auxiliary power unit (APU) on all variants and so is completely interchangeable. Removals are about once every 6,000 flight hours and shop visit cost is \$125,000-\$250,000.

In summary, one should expect to put two engines through a shop visit at a cost



Build cost for a DC-10-30CF is in the region of \$25 million for a late 1970s aircraft. British Airways has just concluded a deal to sell all its DC-10s and four will be immediately converted to freighters. These will be taken by Gemini.

of \$1.5 million each. Consideration should be given to the most economical way to deal with run-out or time-continued engines. That is, putting an engine through a shop visit may not always be the only and most economical choice. The investor should then consider how to acquire spare engines for lessees. Engine leasing is a fast growing business, and the number of options and opportunities is growing.

Build cost

An acquisition cost of \$8-\$12 million, D-check at \$3.0 million, landing gear and APU exchange at \$0.5 million, two engine shop visits at \$3.0 million and conversion to freighter at \$8.5 million give a total build cost of \$23-\$27 million. The up-front cost for an aircraft to be leased to an inclusive-tour carrier will be at least \$8.5 million lower. It may be even less if heavy maintenance that normally takes place with freighter conversion is avoided. Re-configuration of the cabin however, to a high-density single-class

layout, can be performed during a C-check which has a cost of about \$400,000. The cost of new interior materials will have to be added to this. All up acquisition costs would then be \$13.5-\$17.5 million or even less if engine shop visits were not imminent.

Maintenance reserves are another issue for investor and lessee to consider. Many can be derived from the maintenance costs described.

Financing

Most financing structures will see an equity portion of up to 25% which will be as much as \$6.25 million for an aircraft with a build cost of \$25 million. A conservative estimate is that the equity investor will require an annual return of 20%. This return is often in the form of a mixture of increased value in the aircraft and annual interest. This can increase the required residual value at the end of each lease term.

The remaining debt is structured so that some could be repaid by lease rentals over the projected remaining life of the aircraft, in this case about 20 years.

Financing terms for debt and equity are determined by the credit rating of the lessee. A strong credit could probably borrow debt at 7% while a medium credit would at about 9%.

The \$300,000 monthly lease rental for a freighter with a build cost of \$25 million then has a factor of 1.2% of build cost. The lease factor for a passenger configured aircraft is at least 1.47% of build. Perhaps a more secure way of financing an aircraft is then for the investor to initially lease the aircraft in passenger configuration, allowing the high lease factor to amortise a large portion of debt in the first lease term. Freight conversion at a later date will then improve the aircraft's residual value and lengthen its life.

The purchase price will have leverage on the lease factor: A build cost of \$25 million for a freighter comes from a purchase price of \$10 million, for an aircraft that is able to generate a lease factor of 1.2%. A purchase price of \$15 million will put total build cost at \$30 million, making lease factor just 1.0, which is probably too low for most investors. Only DC-10-30s with the lowest values can make an investment case stand up.

The DC-10-30 has always been regarded as worth the risk. This is particularly true when it is compared with other used aircraft investment prospects, such as the 747 and 727. While the DC-10 certainly has strong durability and freighter prospects, the one factor that could now cast some doubt on the DC-10's residual value resilience is the MD-11. Although the MD-11 is too large and too expensive to justify investment for most investors, its availability will soften demand for DC-10-30s. It could even pose a more serious threat to the DC-10's residual value in five to ten years. Although the MD-11 is young, its unpopularity with passenger carriers means prospective freight operators are in a buyers market and can always negotiate low values, casting the DC-10-30 option aside.

The possible threat from the MD-11 does not automatically write off the DC-10-30. DC-10-30 market values, lease rates and residual values will take a knock. This will require readjustment of finance structures by investors, but is unlikely to make the DC-10-30 untenable.

Some investors which have bought recently may see residual values come under unexpected pressure from the MD-11 over the next few years. The MD-11 factor and the Asia Pacific economic crisis will at least provide more cautious investors with leverage to negotiate softer prices and perhaps now change the secondary market's view of the DC-10. The one thing aircraft investors can be certain of is uncertainty. The certification problems that GATX has had with its 747 freighter conversion and the 727 cargo door issue are recent and classic examples.

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