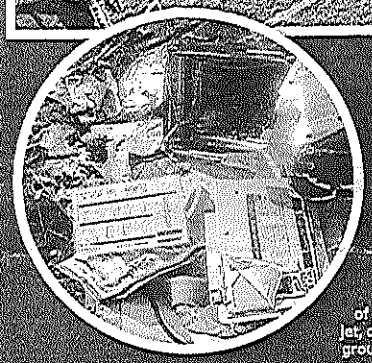
Hundreds of old planes are left to rust away in American deserts



The interior of a Ryanair Boeing jet, dumped on waste ground in Methil, Fife

Grounded: the jet fly-tippers

Boeing and Airbus are striving to keep jets out of landfill, but new composite materials are adding to the problem. By **Mark Harris**

When a Fife council environmental warden spotted aircraft debris near the docks at Methil, on Scotland's east coast, it seemed he was the first on the scene of a terrible accident.

Battered seats, oxygen masks, electronic components and broken fuselage lay scattered over the waste ground. Seat-back emergency cards and tattered in-flight magazines identified the remains as belonging to a Ryanair jet, but none of the budget carrier's aircraft was missing.

In fact, the wreckage came not from an accident or a terrorist attack but from unscrupulous recyclers attempting the most audacious fly-tip ever — the interior of an entire Boeing 737-200.

Ryanair had sold the ageing aircraft in 2004 to the American company Autodirect Aviation, which in turn sold it to Diversified Aero Services in Miami, which contracted two British firms to dismantle it.

Despite its high-tech image, the aviation industry has relied on recycling practices [illegible] Stanley and Son. An international network of leasing companies, holding corporations, aftermarket suppliers and independent dismantlers allows airlines to plead ignorance of the final destination of their retired planes.

And unlike household waste, old electronics and scrapped cars, there are few regulations for the disposal of jets.

The aircraft are typically parked for years in the American desert or stripped of their most valuable materials before the rest — up to 40% by weight, often including hazardous chemicals — goes to landfill.

"There is a very wide variation in the way end-of-service planes are handled," said Bill Carberry, project manager for recycling at Boeing. "Some companies go at it with a fine-tooth comb, trying to get all the valuable material out of them. Others will just take the valuable parts and the aluminium and discard the rest."

In a new aircraft, the engines account for about a third of the purchase price. By the end of its operational life about 20 years later, they can be worth as much as three-quarters of its remaining value. Landing gear, flaps and electronics can also be recovered and sold, and the aluminium hull may be worth [illegible],000 as scrap.

Boeing and Airbus, which make the majority of commercial aircraft, want recycling firms to see the 40% of the aircraft left over as an asset to be exploited, rather than a liability to be dumped.

Inevitably, though, the war in the skies between the American and European rivals has become a scrap in the scrapyards over which has the greenest aircraft and the most efficient recycling system.

Airbus was the first to attempt to recycle a whole aircraft, an Airbus A300. By following a strict procedure of separating metals, stripping out wiring and collecting plastics, textiles and harnesses, it was able to reuse and recycle up to 85% of the plane's weight.

"It's not rocket science, it's just common sense," said Olivier Malavallon, project director for environmental affairs at Airbus. "For example, we found companies that could use obsolete aircraft landing gear to carry sailing boats into dock. The value is not the same as in aviation, but it's better than the materials alone."

Airbus has profitably dismantled eight aircraft at Tarbes-Lourdes-Pyrénées airport, in France, through a joint venture with Suez, the waste management group, and Snecma, the engine firm.

Boeing's network of jet recyclers, the Aircraft Fleet Recycling Association (AFRA), is even more ambitious. AFRA members already dispose of 150 aircraft a year, and have a target of 90% recyclability by 2016.

Its current focus is on recycling the interiors. The cabin fittings for a Boeing 747 weigh about 10 tonnes, 90% of which currently goes into landfill when a plane is overhauled or sold.

"The carpet in an aircraft is changed every five years," said Boeing's Carberry. "We have helped to develop 100% recyclable carpet that meets aircraft standards. At the end of its service life, you take it out, extract the nylon and make a new carpet from it. Southwest Airlines has been flying with it for nearly a year and likes it."

New technologies and eco-friendliness do not always go hand in hand, however. Carbon fibre composites are the key to the fuel efficiency of Airbus's new A380 superjumbo and Boeing's forthcoming 787 Dreamliner. They are incredibly light, incredibly strong — and incredibly difficult to recycle, said Colin Johnston of the Materials Knowledge Transfer Network at Oxford University.

"To recycle a 787 today, you would pretty much have to dig a big hole in the ground and drop it in," said Johnston. "The resins in composites are quite nasty chemicals and the carbon fibres themselves don't disintegrate in the environment. To all intents and purposes, they are indestructible."

Recyclers are having to work out how to handle composites even before the 787 welcomes its first passengers, because there is a growing stockpile of unwanted carbon fibre to deal with. "Composite manufacturing is not hugely efficient and there is already a lot of manufacturing waste," said Johnston.

Researchers are experimenting with arcane processes involving microwave digestion and high-temperature plasmas, and Boeing has found one possible solution. "We've been making proof-of-concept stow bins and ceiling panels out of 787 fuselage manufacturing scrap," said Carberry. "We're trying to build parts out of recycled carbon fibre that are then recyclable. We could have interiors that are recycled and reused several times over. But none of this stuff is on an airplane yet; it's not airplane ready."

The same could be said for many of the industry's green initiatives. Responsible recyclers are struggling to cope with cabin and cargo linings from older aircraft, insulation material and mixed or polluted waste.

Above all, although Boeing and Airbus are firmly committed to their recycling projects, they still handle less than a third of all the passenger aircraft dismantled each year. With 6,500 aircraft due to go out of service during the next 20 years, that leaves a lot of companies that are willing to put profit ahead of the environment.

AFRA officials believe that if another fly-tipped jet comes to light, governments round the world will be forced to step in and impose new rules.

waste powers up fuel cells

William Kay
Los Angeles

A CALIFORNIAN bleach manufacturer is working on plans to power its factories with its waste chemicals.

K2 Pure Solutions of Pittsburg, a small town 40 miles northeast of San Francisco, is to start making fuel cells from the hydrogen-based waste created during its manufacturing process.

The firm is using technology developed by a Canadian joint venture led by Daimler and Ford which is being refined for use in hydrogen-powered cars.

The plan will allow K2 to move towards becoming self-sufficient, powering equipment by electricity generated from its own leftovers.

David Cynamon, K2's executive chairman, said: "We will be able to produce high-quality safer bleach with nothing more than water, inert salt and affordable, environmentally clean electricity."

The initial installation will generate 163 kilowatts. K2 estimates that this will displace 220 tons of carbon dioxide emissions a year, equivalent to removing almost 40 cars from the road. The system can produce up to 10 megawatts.

"IT PROVIDES CLEAN POWER AT A LOWER COST AND HIGHER EFFICIENCY"

Until recently,