

PANORAMA

DIE BY WIRE

- everything you didn't want to know about airliner wiring.

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MANGOLD: As millions of British tourists prepare to fly on their sunshine holidays, Panorama reveals

the explosive secret hidden inside their planes.

BAUMEISTER: I want to know why the traveling public in the world continues to fly on planes that the

manufacturers, the airline and the government know are unsafe due to defective wiring.

MANGOLD: At exactly 18 minutes after 8pm on September 2nd last year Swissair Flight 111 took off from

JFK Airport New York on a routine scheduled flight to Geneva. There were 229 passengers and crew on

board. The flight past without incident but 56 minutes later, while over the US Canadian border,

something began to go terribly wrong. The pilot signaled air traffic control that he was facing a

serious problem. Smoke inside the cockpit. The huge MD11 began to divert for an emergency landing

in Halifax, Canada, but only 11 minutes later the plane's electrical systems began to cut out.

Then the ultimate cockpit nightmare - fire!

MICH BAUMEISTER Aviation Lawyer

We know we had smoke and fire in the cockpit, and we know we had molten metal on the pilot's seats.

All of this was an electrical fire and the wiring in aircraft today is the greatest, the greatest

threat to continued safety of flight.

MANGOLD: By now communications with the ground were lost as one electrical system after another

broke down. The pilots also lost control. For 6½ sickening minutes the plane spiralled out of

control plunging from 20,000 feet into the dark Atlantic, close the Eastern Canadian (sea board?).

The quiet beauty spot, Peggy's Cove in Nova Scotia became the plane's graveyard. Flight 111 was

only moments from Halifax International Airport. There were no survivors.

LYN: He didn't have to die. None of them had to die.

MANGOLD: Raymond Romano and his window Lyn, there are three children.

LYN: I was with him for over 25 years. It just got better every day.

MANGOLD: What's the one thing that you...

LYN ROMANO

There is no one thing hon., there is no one thing. He was half of me, you see?

He was and that's not

symbolic. It's not. He made me who I was. That's gone. That one's gone that part.

MANGOLD: They soon reached the wreck under water and for nearly a year the searchers continued for the

pitiful remains, each small find important to devastated families and crash investigators. They've

retrieved most of the plane. Personal effects as small as treasured wedding rings have been found,

everything carefully recorded. Yet this catastrophic crash may become the turning point on an issue

of air safety that remains largely hidden. The Canadians now have it in their grasp to prove something

that has been suspected for 20 years. A new and frightening truth is emerging from beneath the calm

waters of Peggy's Cove.

TOM MANGOLD

Swissair 111, all 230 tons of it, hit the water at over 200 miles an hour. It was like hitting concrete,

and today this Canadian Airforce base, it's been painfully reconstructed, a one million piece jigsaw of

tortured metal and wires, especially wires. For the focus of this catastrophe currently centres on

evidence no larger than a single strand of fuse wire.

These are the only recognisable pieces of the plane that have been lifted to the surface, giant steel

engines bent like cardboard. But there are no clues here to what really happened in those last

desperate minutes. The crash detectives are concentrating on the front 9 meters of the plane. It's

inside this plastic and metal haystack of detritus that the investigators are seeking tiny needles of

metal to reconstruct the wiring of the cockpit roof, for this is where the terrible fire started. The

solution may help answer a much bigger question.

MICH BAUMEISTER

Lawyer for Families of Swissair Victims

I want to know why the traveling public in the world continues to fly on planes that the manufacturers,

the airline and the government know are unsafe due to defective wiring.

Dr VERNON GROSE

Ex-US National Transportation Safety Board

Wiring is emerging now as that number one thing to be concerned about and it may take one or two more

crashes before we actually acknowledge that.

MANGOLD: Every large modern passenger jet contains some 150 miles of wiring. The hidden blood vessels

that carry power the thousands of functions today's modern jets must perform. For years the manufacturers

have treated wire as wire. Fit and forget. But that's all changing. Wiring is not as innocent as it

first looked. Seattle, home of the Boeing

Aircraft Company, 90% of the planes flying today come under its wing. Until 8 years ago, most of its

aircraft contained a particular aircraft wire insulated with a plastic material known colloquially as 'Kapton'.

This is a piece of Kapton insulated wire. It's still made this day and flies in over a third of the world's

commercial planes. Kapton is best when young. It's feather weight, the thickness of only about three human

hairs, flame resistant, tough. That was the good news. And this is the bad. The Kapton insulation can explode

like a firework if it's chafed and rubs against metal. That's called 'dry arcing'. Worse still, salt

water or solvent can penetrate the insulation and cause the same problem. That's called 'wet arcing'.

Most wires, when they short-circuit, simply spark and blow a fuse. But with Kapton insulation, the spark

explodes and arc's setting light to the plastic insulation. Inside the confines of the plane, and with

alarming speed, this can quickly spread into a lethal weapon of toxic fumes and flames. And this is the

culprit - Kapton insulation burnt to a crisp.

MIKE NANCARROW

Director of Airplane Safety Boeing

We haven't seen anything that we consider, at this point in time, anything that could be attributable to

the wiring type, whether it's Kapton or any other wiring type at this point.

MANGOLD So are you saying essentially Boeing has no problem with Kapton insulation and has never had one?

NANCARROW: That is correct.

MANGOLD: But one man who believes that's bunkum is Ed Block. For ten years the Pentagon's top wiring

expert, and now member of the government committee investigating problems with aircraft wiring. He's a

merciless opponent of dangerous wire insulation on planes, prodding an airline industry he believes is

simply unable to face the truth about Kapton wire. Today he's inspecting old wiring at this aeroplane

graveyard in Arizona.

ED BLOCK: We have to first get out of the denial phase and say that we do have a wiring problem. There's

an horrific amount of wire damage out there unbeknownst to everyone. They were not designed to be inspected,

they were not designed to be worked on. That's why most of them, as you can see, are lint covered and have

metal shavings in the lower sections due to cabin changes and conversions. It's just everywhere.

MANGOLD: Block explained how all that wiring is tucked neatly out of sight and out of mind of the passengers.

BLOCK: They don't see the miles and miles of wiring running under their seats, over their heads. They're

in a spider web, if you will, of Kapton wiring here.

MANGOLD: The L-1011, known in Britain as the Tri-Star, was built by the Lockheed Company in the late 60s

and 70s and was one of the world's earlier more comfortable jumbos. Several still fly on scheduled routes

for British Airlines.

The first major American carrier to take the Tri-Star was TWA Transworld Airlines. Their man in charge of

aircraft wiring matters was Bill Gasper. Before TWA bought the fleet, Gasper obtained the wire. It was

the first time he'd seen or touched it and he didn't like it.

BILL GASPER

Senior Projects Engineer TWA 1965-83

was very stiff and springy. A very slight nick in the wire would, if you bent it or vibrated it in a certain

way, the nick would propagate to the conductor and the bare conductor was exposed.

MANGOLD: And this was the problem. When the bare wire was exposed and touched metal, there was the spark,

arcing then fire. Gasper, a wire expert to his finger tips, decided to apply some low science to testing

the wire in his kitchen.

GASPER: I wrapped some of the wire around a 20 penny nail, slightly nicked it. Some of it I put into hot

water that was warmed to a temperature almost boiling, some of it into an oven.. my wife's oven. Upon

doing that for a short period of time, in some cases a longer period in the oven, the nick opened up quite

dramatically. I recommended that it not be used on L-1011 aircraft.

MANGOLD: And what was the answer?

GASPER: The Lockheed response was that we obviously are going to have a difference of opinion between

our two wiring experts.

MANGOLD: You were overruled?

GASPER: Exactly.

MANGOLD: So TWA took delivery of its fleet of L-1011 Tri-Stars from Lockheed all fitted out with

Kapton wire. Sure enough, as Gasper had feared, the problems began just six years later. The first was in 1972.

GASPER: Well this was a wire bundle running under the floor below the aft lavatories on an L-1011. For some

reason that bundle had a catastrophic failure where the bundle exploded.

MANGOLD: Literally exploded?

GASPER: Yes, it cut itself in two.

MANGOLD: You didn't know before then that a bundle of Kapton could explode and cause fire?

GASPER: This was my very first experience with it.

MANGOLD: And what was your reaction?

GASPER: I looked at it as a precursor of what was going to happen on Kapton installations in the future.

MANGOLD: Increasingly disturbed by the performance of the insulation Gasper now turned detective and began

his own investigation into the insulation safety record. Soon he identified a total of 22 Kapton fire events

in the Tri-Star fleet, some of them potentially catastrophic. By 1978 TWA was ready to buy Boeing aircraft but

Gasper believed it vital that Kapton not be used in the new fleet.

GASPER: I wrote a letter to Boeing indicating that we strongly object to its use because Transworld was going

to have future orders through Boeing and we did not want the wire on any future aircraft.

MANGOLD: The TWA letter was unequivocal. "Because of Kapton's minus factors, we will strongly object to any

proposed use of this wire on future TWA aircraft."

MANGOLD: Boeing was told by one of the largest plane operators in the business "We don't want Kapton in our planes anymore." What did you do when you got that letter?

MIKE NANCARROW

Director of Airplane Safety, Boeing

What we did was we took the letter and we asked our wiring experts to sit with the appropriate people in TWA,

explain the characteristics of the wiring which we did, and as a result of that, they re-evaluated their

position and subsequently the Kapton continued.

MANGOLD: You talked them out of it.

NANCARROW: We explained our position with regard to wiring and they continued to.. they said it was okay

to use Kapton.

MANGOLD: And then you had a letter from United Airlines saying exactly the same thing.

NANCARROW: That's true, and we used the same process.

ED BLOCK

Aircraft Wiring Consultant

Boeing should have taken a step back rather than making more and more aircraft, they should have done an

overall assessment to see if this is as bad as these operators claim. They've maintained that they're the

pre-eminent safety gurus in the industry. If they are, then they should have been on top of this issue from day one.

MANGOLD: But one major consumer of Kapton wire was across the problem from the very beginning. Boeing may

have talked the civilians out of their fears, but the United States Navy, its aircraft also wired with

Kapton, was not prepared to take chances with its pilots' lives or its battle planes. This is Davis Monahan

a US military aircraft graveyard in Arizona. Many of these sad Goliaths are in mothballs, but others are here

because the US navy had such serious wiring difficulties with its planes in the mid 80s, that some of them

had to be withdrawn from service to this shrink wrapped obscurity.

While the civilian authorities remained remarkably relaxed about Kapton, the US Navy, faced with several

unexplained wiring fires and inflight explosions, decided to do some testing of its own. Their top wiring

man then was Bob Dunham.

BOB DUNHAM

US Naval Air Systems Command 1972-91

We had to do battle damage assessments on every aspect of the aircraft to see how quickly we could repair,

how quickly we can find our faults.

MANGOLD: Bob Dunham's tests were a little more dramatic than Bill Gasper's.

DUNHAM: We took a wiring harness and we put aircraft power to it, then we shot at it, and it exploded.

"Arcing in plane began immediately and the fire and arcing traveled along the harness for about 10 seconds

after the impact."

DUNHAM: When this thing exploded, small balls of copper - because the wire is tin-plated copper, and at

5,000°C it boils up and it explodes, actually hit some of the participants.

MANGOLD: Shooting bullets at the wire was effectively a way of accelerating the chafing process. Next,

Dunham's team found something even more frightening about Kapton. Normally these circuit breakers,

like a fuse box, can be re-set by the pilot after a wiring short-circuit. But when Dunham's people did

it with the Kapton insulation, something quite

different happened.

"When this breaker was re-set, more arcing and burning occurred which

re-tripped this breaker and caused four more to trip."

DUNHAM: This was the other thing that we demonstrated that once you have a wire fire, an arc

tracking in a demonstration the circuit breakers pop. You reset that circuit breaker and it'll

continue, it'll go again in increased intensity.

"When the third one was re-set, the arcing became more violent with flames

engulfing the bundle and more breakers tripping. As you can see, the fire

continued to travel along the harness and beyond the target area. And it

appeared that the flames would continue and set fire the power supply panel."

ED BLOCK

Aircraft Wiring Consultant

By re-setting that circuit breaker he's re-energising that wire bundle, that system, and essentially

creating an arc track event that can then melt down through succeeding bundles, knock out all his flight

control systems, his navigation systems etc, and bring down the aircraft.

MANGOLD: The thing that seems to send a chill through many a pilot's heart is that if Kapton arcs, if

there's a flame, if the circuit breaker goes, and he re-sets the circuit breaker, he's making things much

worse. Have you alerted people to that danger?

MIKE NANCARROW

Director of Airplane Safety Boeing

I can't comment on that. I think that again that's something that you would have to talk to our wiring

experts about.

MANGOLD: Well I'm talking to you as a wiring expert.

NANCARROW: I do not consider myself to have the expertise in wiring that you are asking of me.

MANGOLD: All right. You were nominated by Boeing to talk to me. Do you believe that it would be useful

to alert pilots to this danger?

NANCARROW: I can't comment on that.

MANGOLD: The US Navy was ruthless in dealing with the Kapton problem. By 1987 the order went out to

purge the insulation from its fleet of war planes, and where possible, Kapton was replaced with a safer

version in the US Marine Harrier Jump Jets which had originally been wired with it. Those they couldn't

afford to rewire were simply put out to sand.

By August 1987 the US Navy had banned Kapton from all its future planes. Boeing

say the problems were
confined to military planes only.

NANCARROW: The military application and the conditions that they operate in are far more severe than we

would ever see quite frankly in terms of the type of atmosphere that they operate in and the temperature conditions.

MANGOLD: But what about the arguments that a navy plane lands on carriers, it's exposed to more water,

much more stress, much more tension, as opposed to a civilian airliner which just flies along all it's life.

BLOCK: It flies along, vibrating as it goes, constantly. The military aircraft are rated at 10,000 hours,

commercial aircraft are flying in excess of 93,000 hours now, so that whole idea that it's just a military

issue is just off base.

MANGOLD: A Boeing 757 registered to Monarch Airlines was the first known British plane to suffer a serious

Kapton problem. In January 1985 Monarch Flight 390 was flying from Tenerife to Luton when passengers heard

two loud bangs and watched in horror as smoke entered the cabin. As the plane lost electrical power the pilot

was forced to make an emergency landing in Portugal.

BLOCK: There was some lavatory fluid that came down on a wire bundle, knocked out the EFI as the flight control

systems went totally blank, and there was an arc tracking event.

MANGOLD: Investigations soon revealed that toilet liquid, Loo Blue, had leaked onto damaged Kapton insulated

wire causing an explosion and fire.

How serious could that have been?

BLOCK: It could have totally caused the plane to crash.

NANCARROW: In that particular case, the data that we have did not indicate that that was a problem

associated with the wiring type. It's possible it could have been caused by the way in which the wire

was actually installed.

MANGOLD: By you?

NANCARROW: We don't know.

MANGOLD: But if you don't know, and you have an accident as serious as that, would it not be

incumbent on you to find out as quickly as possible?

NANCARROW: Well as I said before, when we find something like that, we take whatever steps we

have to take in order to fix the problems. We don't wait.

MANGOLD: What steps did you take?

NANCARROW: I can't tell you what we did. I'm not aware of the exact steps.

MANGOLD: But we've uncovered other Kapton incidents which cannot all be blamed on faulty installation.

May 11th 1990, Manila, Philippine Airlines 737, fire on the ground, 8 killed.

March 17th 1991, Canada Delta Airlines Tri-Star, in-flight fire, emergency landing.

November 24th 1993, Copenhagen, Scandinavian Airlines MD87, fire on landing, plane badly damaged.

It wasn't until 1988 that America's Federal aviation administration decided to investigate Kapton

insulation for itself. A series of tests completely confirmed Bob Dunham's military experiments

conducted 8 years earlier. Nevertheless, Kapton continued to be used as an insulation in the

majority of planes right until Boeing introduced a new safer insulation in 1992. Boeing made the

change but strangely it's major European competitor air bus industry continues to install Kapton

insulation in the passenger cabins and cockpits of its air buses to this day, and although the

British have banned Kapton in new aircraft designs for 8 years, it's still permitted in new planes of old design.

The Federal Aviation Administration, the FAA, here in Washington, is the government agency regulating aircraft

safety matters including wiring. Much of its work and many of its decisions set the lead in Britain too.

Twice we've asked for an interview on the subject of wiring and twice this has been declined without explanation.

So if Kapton insulation is as potentially dangerous as alleged, why have we heard of so for example, few Kapton

related disasters or serious incidents. The truth is that figures are there, they just haven't been recorded

in the right way.

Dr VERNON GROSE

Ex-US National Transportation Safety Board

If you don't look for something, you won't find it, and the way that data are being collected, even in

commercial operations, how you designate bringing down an aeroplane under emergency conditions can be

wire-related and never be seen.

MANGOLD: One problem is the airline regulatory authority's dogged insistence that wire is wire. They failed

to distinguish Kapton from other insulation's. Wire is wire. Fit and forget.

GROSE: If, for example, let's say that the auto-pilot fails and the aeroplane has to come down early. If it

comes down and the reason the auto-pilot failed may well be a wiring problem but it will never be designated

that way. It'll be called an auto-pilot failure.

MANGOLD: So it's there but we can't see it.

GROSE: We don't want to see it I believe.

MANGOLD: Could it be that there are many more wiring incidents hidden in the database going right

back to the 70s, going right back to the introduction Kapton but also including other wire types,

could it be that stuff hidden there, which nobody knows about, until they go back and look at it

because the state of knowledge is better now than it was?

MIKE NANCARROW

Director of Airplane Safety Boeing

Well again I really can't speculate on that. I guess the best way of answering it is to say we're going

to look, we'll examine everything with a fine tooth comb and we will do what we have to do in light of

what we find to make sure that everything is covered.

MANGOLD: The plane maker's tooth comb might usefully investigate, as has Panorama, several more recent

serious incidents involving Kapton wired planes.

May 28th 1996, Boston, Martinez 767 major electrical failures, emergency landing.

January 9th 1998, Heathrow, United Airlines, 767, inflight electrical fire, emergency landing.

December 8th 1998, Lusaka, British Airways, 747, fire on the ground.

And the biggest air disaster of all, the worlds sixth worst, the still officially unsolved SV163. This is the wreckage of

a Saudi Arabian Tri-Star in which 301 passengers and crew perished. In August 1980 it made an emergency return

to Riyadh Airport after a fire in the cargo section spread to the passenger cabin. When firemen hacked their way

in they found everyone dead. The inquiry blamed a fire in the hold but left open the reason it started. The truth

is that in 1980 Kapton's potentially lethal fire properties were not widely known. Twenty years later, in a quite

bungalow by the Sussex coast, one man who was deeply involved in the disaster is enjoying his retirement. Eric

Newton was Britain's top air crash detective in 1980 when he was invited by the Saudi's to add his unique forensic

skills to the crash investigation. He reached preliminary conclusions. Last week we discussed his report and

I showed him the new evidence about Kapton. Now he has few doubts what caused the crash.

MANGOLD: Essentially you are saying in this report that you thought the ignition source would be the arcing.

ERIC NEWTON: (Ex-UK Air Accident Investigation Branch)

Electrical arcing, yes. Considerable examination of all the remaining wires showed the typical globules of

molten copper wire and this sort of thing which to me indicated that arcing had taken place while the electric

current was passing through the wire, and this, in my opinion, was the ignition source.

MANGOLD: Did you know at that stage that when this wire chafes it can create a tiny explosion like a firework

at 6000°, you didn't know that did you?

NEWTON: No, I didn't, no.

MANGOLD: If you'd known that then, presumably you wouldn't have had any difficulty in firming that conclusion up.

NEWTON: Probably not, no, I agree.

MANGOLD: In the early 90s the Kapton problem reached the British Royal Air Force with predictable results.

The RAF, which had recently bought a fleet of replacement Harrier jump jets from the US, soon lost one of

its planes.

SIR MICHAEL ALCOCK

Chief Engineer, Royal Air Force 1991-96

It was a fire in the air. The aircraft was abandoned by the pilot because he had a complete power

systems failure. The investigation pointed to a particular series of connectors and these connectors

were using cable that had Kapton as a product in it.

MANGOLD: The joint British/American Harriers were delivered with Kapton wiring despite a clear warning

given to the RAF a few years earlier by a US naval team led by Bob Dunham.

BOB DUNHAM

US Naval Air Systems Command 1972-91

"We went to Farnborough and I can't remember the exact number wiring harness that we took but I think it

was somewhere in the area of about 60 and we powered it up with aircraft wiring and we fired at it.

I can't remember the exact number but at least 70% of those wiring harnesses that we shot at exploded

as a result of the arc tracking."

MANGOLD: "What was the RAF reaction?"

DUNHAM: "Well they were astounded."

MANGOLD: The RAF lost at least one more Harrier to a Kapton fire. Ultimately their Kapton wired planes

had to be modified at huge expense. But why, after Dunham's warnings, had they originally agreed to have

the planes wired with Kapton at all?

DUNHAM: "I was told that the reason for it was that we had agreed to take this aircraft warts and all, and

if at that time we had insisted on rewiring it differently then the cost would have been astronomical."

MANGOLD: "So it was a cost factor."

DUNHAM: "Cost must have come into it, yes, and time I should think as well."

MANGOLD: This is a British Aerospace 146, a popular commercial plane, but this is one of three that

belongs to the Queen's Flight, now renamed the Royal Flight. The coffin of Princess Diana was brought

back from Paris by Prince Charles in one of these planes. Now the Royal Flight is available to top

government VIPs as well. Tony Blair flew in one from Cologne last month. They're Kapton wired, and

although the MOD says they are all perfectly safe, we've discovered serious and previously unpublicised

concerns. Former RAF Warrant Officer Les Gray was called, in 1988, to investigate a short circuit and

fire in one of the royal planes.

LES GRAY

Armed Services Engineering Authority 1966-90

"When we got to Queen's Flight we found that the cable was Kapton and it had carbon arced and

destroyed the cable and the loom. Caused quite extensive damage. If it had not been caught with

the doors down - when they were doing the engine testing they had the engine doors down and it was

spotted very quickly and put out - but if the engine doors had been up and hidden, then a major fire could

have occurred on that aircraft."

MANGOLD: "And if the Royal Family had been on board they could have been trapped."

GRAY: "Well yes, any fire on any aircraft is a dangerous situation."

MANGOLD: Despite these warnings these 146s still carry their important cargo of royals, top politicians and

VIPs in Kapton wired cabins.

"You would not wish the Royal Family or any VIPs to travel in a British Aerospace 146 which has original

Kapton insulated wire?"

ALCOCK: "I wouldn't want anybody to travel in it."

MANGOLD: South West Airlines in Dallas Texas, and a video promotion to highlight the vibrant, no frills,

young American airline. But behind the fun is an airline that despite, or because of its, aggressive cut

price policy, takes any wiring issues very seriously indeed. There can be no margin for error in an airline

whose planes work so hard. But even safety conscious South West recognise the physical limits on inspecting

all the wiring.

DALE STOLZER

Engineering Director, South West Airways

The visual inspections that we're doing on the aircraft right now is basically what we have available to work

with right now. There are other laboratory type inspections that people are trying to develop now because of

a new emphasis on ageing wiring, but none of those are really usable in the field yet. As Kapton ages, like

all aircraft wires, it becomes brittle and potentially more dangerous. That makes the ability to inspect for

wear and tear even more crucial. The engineers know that they can't get at much of it. What do the plane

makers think?

A substantial amount of aircraft wiring, civilian aircraft wiring, is inaccessible.

MIKE NANCARROW

Director of Airplane Safety Boeing

I would say that a large proportion of the wiring is in fact accessible and what happened is during a

major check which can occur over a period of years or regularly over a period of months, the aircraft is

opened up and virtually all of the wiring is available for inspection.

STOLZER: There are portions of the aircraft where the wiring is almost totally inaccessible and the reason

for that is the wiring is built into each section of the aircraft as it is originally manufactured and then

the large sections of the aircraft are assembled. So completely re-wiring the aeroplane or gaining access to

every inch of every wire on the aircraft practically once the aeroplane is assembled it's just not feasible.

MANGOLD: And here's the proof. Inside the belly of a 737 wire bundles are undergoing a formal inspection.

What they're looking for is age wear, tiny cracks in the insulation, evidence of previous charring. In truth

an impossible job even for a skilled technician properly equipped and with a

month or two to spare.

"Now you've got how many wires in that bundle there? It looks like 50/60 do you think?"

TECHNICIAN: "I couldn't tell you. There's a lot."

MANGOLD: "Is it possible to check each one or can you just do as you're doing now, spot check."

TECHNICIAN: "Well we just do the best we can with the wire that's accessible. I can use a mirror to look

at the back of the wiring."

MANGOLD: "And that's all you can do?"

TECHNICIAN: "Yes."

MIKE BAUMEISTER

Lawyer for Families of Swissair Crash Victims

Some mechanic crawls into an aircraft, look at a wire bundle from the exterior, really can't get into

the inside of that bundle, and for the most part can't even see most of the bundle as it travels through

the plane. It's valueless.

MANGOLD: The airline industry, dynamic at its best, smug and cosy at its worst, seems impaled on the

horns of the Kapton dilemma. The implications of a full revelation of the truth are potentially terrifying.

Half the world's fleet could be grounded. Modification costs, astronomical bankruptcy is inevitable.

Industry nervousness is already evidence from some of the replies we've received from the major airlines

when we ask them to tell us about their Kapton experiences.

[Lufthansa](#) German Airlines:

"I regret we are unable to provide answers to your various questions.

[Air France:](#)

"We do not wish to comment"

[Air Portugal](#) told us they had no Kapton in their fleet but the record shows they do.

[Alitalia](#) told us to talk to the manufacturers.

Virgin Atlantic, British Airways, British Midland and Caledonian said they had no Kapton problems.

BAUMEISTER: So the bottom line is, it was an industry that was asleep at the switch. Now they're

faced with a huge problem. What do you do as the CDO of Boeing, say 'we're going to rewire these

aircraft? You can't. We're going to give the airlines new airplanes? You can't. What are you going

to do as an airline? Say we're going to ground the fleet because we have this problem? You can't.

What does the FAA do, say we're going to ground the fleet and put the aircraft manufacturers out of business

until they come up with safe wires and safe inspection and maintenance procedures? They can't so what do we

do? We ignore it.

MANGOLD: But not quite. In Halifax Canada the entrails of Swissair 111 are being remorselessly poked and

prodded and carefully sorted and reconstructed, to salvage the truth about that dreadful crash. Last month

the investigators revealed a little of the focus of their work. It was soon clear what they're really

concentrating on.

JIM FOOT

Crash Investigator, Canadian Transportation Safety Board

Among other things you try to find is the origin of the fire, and what we need to do is find a source of

ignition so one of those sources of ignition energy we know can be electrical wiring. This is the size

of wire that we're actually trying to find. Today we have found 13 wires that show arcing damage. The

two I have just mentioned, I have a photograph here that shows 8 more of them.

MANGOLD: The Canadian investigators, proudly independent, but less friendly with aeroplane manufacturers than

their American cousins. The hard truth may yet emerge. Flying remains a very safe way to travel. The chances

of death or injury in a plane are one in one and a half million. A consolation to all apart from those who

have become statistics. In a quiet park an elderly and lonely man lives with bad dreams and memories.

This is Jake La Motta, 'Raging Bull', former middle weight boxing champion of the world. He lost his second son,

Joseph, in the Swissair Crash.

JAKE LA MOTTA

I was at home at the time when my friend and attorney called me up and he said to me "Jake, I think you're son

just died on a plane crash." And I said "What do you mean he's died? Took him to the airport, I put him on the

plane and I just found out on TV that that plane crashed and they think everybody died.. They say parents should

never bury their children. Joe's father lives with words trapped and unspoken forever.

MANGOLD: What's the last thing you would have wanted to say to him?

LAMOTTA: I love you son, be happy. I love you son, be happy.

MANGOLD: And for Lyn Romano too, no chance for goodbyes. Only the sense of what might have been for both of them.

LYN ROMANO: He lived his life as a dignified man for a purpose, and now he's dead, for nothing.

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