Article

A LONGITUDINAL ETHNOGRAPHIC STUDY OF AIRCREWS' LIVED EXPERIENCE OF FLYING OPERATIONS AT A LOW-COST AIRLINE

SA Bennett

Correspondence: Dr SA Bennett, Institute of Life Long Learning, University of Leicester, 128, Regent Road, Leicester, UK

E-mail: sab22@Leicester.ac.uk

Abstract

With reference to Burke, Wilson and Salas's (2003) call for more "systematic long-term longitudinal studies" of aircrew teamworking, a longitudinal ethnographic study was conducted at a low-cost carrier. Participant observation and in situ conversation were used to generate data on aircrews' lived experience of flying operations. Supplementary data were obtained from company documents. Two conclusions were reached. First that aircrews worked in a complex, dynamic and challenging environment that was, in varying degrees and for various reasons, fatiguing and stressful. Secondly that team members' mutual support, camaraderie and cohesion appeared to enhance their resilience to internal pressures like busy rosters and complex positioning, and external pressures like adverse weather, technical faults, delays and unruly passengers. Given that an airline's survival depends upon the safety and efficiency of its operation, and that teamworking can act to promote safe and efficient operation, it is important that – as Burke, Wilson and Salas (2003) suggest – the industry quantifies the impact of team-building techniques like Crew Resource Management (CRM).

If you are thinking of going into this profession I would really recommend try-ing to talk to an airline pilot about their job, particularly on an informal basis and over an extended period, so you get a "real" understanding of what the job is like … (a First Officer for a charter company cited in Prospects.ac.uk, 2005).

I think that 'airline pilot' is a likely candidate for *number 1 misunderstood job*. Most of the public thinks they have an idea what we do, and very few actually have a clue …. Anybody looking to enter such a turbulent, troubled industry needs to take a long, realistic look at what the job is like before they expend significant time and money to pursue this career (a First Officer for a US re-gional carrier cited in Blogging at FL250, 2005).

Introduction

Perception and reality are not always congruent. Consider, for example, the disjuncture between the official model of farmworking as developed by gov-ernment scientists involved with the herbicide 2,4,5-T and the lived reality of the farmworker as revealed by trade union-sponsored research (Irwin, 1995). The same disjuncture can occur in the field of commercial aviation. Aviation can be seen as a glamorous, enjoyable pastime or as a poorly rewarded and risky battle with fatigue, stress and exploitative terms and conditions. Con-sider the following accounts, the first taken from Gandt's (1999) *Skygods* and the second from Pomerantz's (2001) *Nine Minutes, Twenty Seconds. The Trag-edy and Triumph of ASA Flight 529*:

Chuck Kraft … had spent the past four years eating box lunches and drink-ing bug juice and flying Air Force C-130 transports [i.e. Lockheed's C-130 Hercules turboprop transport aircraft] around the world. During his missions a scene had begun to repeat itself. At each layover – Madrid, Paris, Bangkok, Hong Kong – he would head directly for the hotel where the airline crews stayed. At the swimming pool he would observe the same curious sight: *Pan Am Stewardesses* – Swedish, German, French, American – gorgeous in their bikinis, frolicking around the pool. Frolicking with them would be smiling, suntanned, obviously overpaid *Pan Am pilots*. One day in Bangkok, standing there in his evil-smelling, baggy flight suit … Kraft suddenly fathomed an im-mense truth: *They're doing the same goddamn job I am.*

The crew was coming off a hard weekend of flying: heavy rains, interminable ground delays, surly passengers. On Saturday night, as midnight approached, Gannaway, Warmerdam [pilots], and Fech [flight attendant] had struck a for-lorn pose: standing at the curb in the lamp-lit rain at the Tri-Cities Airport in east Tennessee, the end of a gruelling fifteen-hour day that began in one small southern city and ended in another, standing together but feeling alone and

waiting for a motel van that was, like everything else that day, late. When they arrived at the motel, Gannaway made a quick call home to his wife …. The captain had left his house at six A.M. and seventeen hours later his voice was heavy with fatigue. "Hard day", he said. "Bad weather". The motel's night manager unlocked the motel kitchen for Fech. She took a small box of cereal, a carton of milk, a Styrofoam bowl and plastic spoon to her room. Not exactly five-star dining, but it helped her sleep. The crew made it back to the Tri-Cities Airport by seven-thirty the next morning and returned home to Macon in time for Sunday dinner. Now, up and ready on a Monday morning, they had six flights scheduled, with an overnight in Albany, Georgia. More than a living, this was their life.

Regarding these constructions, Helmreich and Merritt's (1998) observation is noteworthy: "[C]rews do not operate in a vacuum. They are members of an airline that has formal rules …. Their flights are conducted as part of a complex and regulated aviation system …. *[The environment] can provide many complexities and rapid changes* (my emphasis)". Commercial aviation is a complex, risk-laden activity that is subject to many pressures – regulatory, economic (vigorous competition), environmental (adverse weather), technical (equipment limitations and failures), cultural (the right of nation states to opt out of International Civil Aviation Organization Standards and Recommended Practices) and media-generated (a perception that some sectors, like the low-cost sector, are inherently unsafe, see, e.g., Bennett, 2005b).[1] In his September 2005 farewell speech to the Aviation Club, the outgoing head of British Airways remarked:

> [W]e've been through some interesting times [over the past five years] …. Swissair and Sabena have gone out of business, Alitalia's on the ropes and should be out of business. Four big American airlines are in Chapter 11 [bankruptcy protection that distances the airline from its creditors]. Lots of start-ups have fizzled out. Foot and mouth knocked British tourism sideways …. 9/11 knocked the whole world sideways. The costs of that are incalculable …. Then we had a war in the Gulf. Now we've got record oil prices. Then there was SARS – and maybe there will be a 'flu pandemic. It's been a long, frantic ride for the aviation industry and I believe there is more turbulence ahead (Eddington cited in The Aerospace Professional, 2005).

Doganis (2005) observes: "The traditional airline network model appears to be in tatters …. Most network carriers have made substantial losses within the past five years …. Airlines have been battered by both external factors and industry trends". Today, thanks to the Internet, passengers are able to benefit from near-perfect knowledge about schedules and fares. Armed with this knowledge, they are able to hunt down the best services and prices. The balance of power has shifted from the airline and travel agent to the (informed) consumer.[2]

It is possible that commercial aviation is misunderstood by the public and media in the same way that government scientists misunderstood farmwork-

ing, and for the same reason – the substitution of decontextualized stereotypes for personal experience or high-quality, accessible ethnographic research. This paper does three things. First, it generates an evidence-based account of crew-members' work experiences (albeit an account of work experiences in a single airline in a specific sector of the aviation industry at a specific time). Unlike the data presented by Gandt and Pomerantz, the data reproduced here is primary data – unmediated observation. The objective is to provide policymakers with an accurate benchmark against which to judge existing and proposed legislation (which is something the scientists who risk-assessed 2,4,5-T should have had, but did not). Secondly, because of the importance of safety in commercial aviation, the paper makes observations about cohesion, co-operation and co-ordination among and between crewmembers (on the assumption that co-operative behaviour, cohesion and co-ordination promote safety). One of the devices used to promote teamwork is training – specifically Crew Resource Management (CRM) training (both initial and recurrent).[3] CRM has its champions. McAllister (1997) states: "[CRM] … is being increasingly recognised as an essential element in maintaining high cockpit safety standards". Krause (1996) states: "[S]tudies have shown that most safe and accident-free flights are the direct result of CRM".[4] Thirdly, it identifies research questions. As Smither (1988) notes: "Observational research is … quite useful as a prelude to more formal studies. By observing a situation … researchers can develop hypotheses that can be later tested …".

Methodology

Ethnographic study was used to explore aircrews' lived experience of flying operations. Gilbert (1993) defines ethnography thus:

> [T]he techniques are likely to include interviews (usually more like a conversation than a standard interview …), the analysis of documents, direct observation of events and some effort to "think" oneself into the perspective of the members, the introspective, empathetic process Weber called "verstehen".

Three techniques were used to generate what Geertz (1973) called "thick description" (Geertz cited in Heath and Luff, 2000):

Participant observation

The observations reproduced in this paper were made between 29 August 2000 and 13 April 2005. The author made observations from the jump seat (the spare seat located between and just behind the seats occupied by the Captain (left-hand seat) and First Officer (FO)) on 34 duties. Duties usually consisted of four intra-European sectors (flights). A typical flying day would involve return flights to Venice and Edinburgh from Nottingham East Midlands Airport (NEMA), a total distance of some 2,200 miles.

Crewmembers were observed throughout their duty, from "sign on" at the Operations Desk at the beginning of the flying day to "sign off".[5] As a supernumerary crewmember with a full Crew Pass, the author was able to access the Crew Room, ramp, baggage-handling facility and flight deck.

Data were recorded in pocket books. Data sources included observations (made in the Crew Room and on the flight deck) and radio calls between flight crew and air traffic controllers, Dispatchers, cabin crew, etc. (these data were gathered using the jump seat head set).

Conversation

Conversations (in the Crew Room, during the walk-out to the aircraft, on the flight deck while in the cruise, etc.) produced additional data. Conversations were recorded *in situ*.

Document analysis

Company documents provided background information. These documents included Signing Sheets (used to record the arrival for duty of flight and cabin crew) and Personal Crew Schedules (that gives Block and Duty Times[6] for each working day of a rolling 4-week period).

A reflexive comment on the methodology

Naturalistic study has its supporters and detractors. Helmreich and Merritt (1998) support *in vivo* research: "Given the limitations of the laboratory, it seems unreasonable to assume that most findings from laboratory groups can be generalised …. [W]e concluded that meaningful data … could only be acquired in real work settings". As for naturalistic studies of the flight deck, they say: "The cockpit of a jet transport is a splendid place to study individual, group, organisational and national factors involving human interaction …". In contrast, Brannick *et al.* (1993) are critical of what they call "descriptive measures of team process": "[S]imple frequencies of behaviours will probably never be enough … because they imply little about what the behaviour means. However, observers are likely to miss important team behaviours, either because too much is happening … or because the observer is unaware that a particular behaviour is important". (On this last point, given that the observer spent 34 days with crews, it is reasonable to assume that he developed some understanding of the labour process.)

There are questions about the representativeness of the data, given the paper's focus on a single airline and business model (the "low-cost" model, see Lawton (2002) for a definition). It should also be noted that the act of participating and observing may change the nature of that which is being observed (see, e.g., Burgess, 1982) and that events may be perceived differently by different observers. Smither (1988) notes: "[I]ndividuals often have very different

ideas about a situation". Finally, as Atkinson (1990) points out, the ethnographer's account is no less a construction that the social text he interprets: "[T]he notion of reflexivity recognises that texts do not simply … report an independent order of reality. Rather, the texts themselves are implicated in the work of reality-construction. This principle applies not only to the spoken and written texts that are produced and interpreted by social actors, but to the texts of social analysts as well. From this point of view, therefore, there is no possibility of a neutral text. The text … the research paper … is just as much an artefact of contrivance as is any other cultural product".

   Despite these methodological weaknesses, *in vivo* studies of workers proliferate. There is, for example, Ginnett's (1989) study of a US airline crew's 4-day duty, Heath *et al*.'s (1999) study of underground train drivers and Pickard's (1989) refined portrait of Wearside shipyard workers: "I spent almost a year with the workers, taking photographs, tape-recording conversations and filming interviews". (This paper's research method most closely resembles that used by Ginnett, 1989). The naturalistic tradition is much in evidence in social history, too, as with Britain's post-Second World War Mass Observation project, the Centerprise Trust's *A People's Autobiography of Hackney* (an oral history of the London Borough of Hackney consisting of in-depth interviews with thirteen Borough residents) and the Greater Manchester Low Pay Unit's (GMLPU's) *Workers' Voices: Accounts of Working Life in Britain in the Nineties* (described as: "[A]n edited transcript of interviews undertaken with twelve people …"; GMLPU, 1995).

Structure and presentation

The paper is a "walk through" of the duties undertaken by crews as they work the airline's four, and occasionally five-sector days. The day begins for all with a commute of some sort and ends in the Crew Room where the crew performs a de-brief before heading home. The paper's structure replicates this linear progression of activities and duties.

   Theories of human performance and teamwork are used to generate an analytical frame for the data. Reference is made throughout the paper to the work of Ginnett (1989), Brannick *et al*. (1993), Guzzo and Dickson (1996), Green *et al*. (1996), Krause (1996), McAllister (1997), Helmreich and Merritt (1998), Bartol and Martin (1998), Campbell and Bagshaw (1999), Cooper *et al*. (2001), Burke *et al*. (2003) and others.

Thick description

Introduction

The working day for flight and cabin crew consists of a number of distinct phases: the commute to base; report to the Crew Room; flight-planning; pre-

flight (CRM) briefing; aircraft preparation; sectors (point-to-point flights); turnarounds; and end-of-duty routines. This sequence provides a structure for the presentation of data.

Commuting

Commercial aviation is a volatile industry (Doganis, 2005; Pilling and Field, 2005). Crewmembers may find themselves made redundant more than once during their flying career (one FO had been made redundant from her position as an Airbus A330/340[7] pilot following the 11th September 2001 terrorist attacks. By May 2002, she was under training at the subject airline as a Boeing 737-300[8] pilot). It is not always possible to find new employment at the same base. If employment is found elsewhere, crew may elect to commute rather than move. Crew can find themselves either commuting significant distances (car journeys of over an hour are not uncommon) or lodging near their new base. The incentive to commute is greater for those who are settled (e.g. those with children of school age). Also, crew may find it difficult to move to an area where rents or property prices are high. Commuting lengthens the working day and creates additional risks (like having to undertake a lengthy car journey in darkness while fatigued and/or stressed). One Captain, on learning that his FO's car journey to work could take 90 min, remarked: "Three hours on the day is not safe". Lodging creates a different set of problems, such as the absence of support networks. Monotony and loneliness can result.

A form of commuting – "positioning" – is done on company time. When crew are at the wrong point on the network for their next duty they are positioned to the appropriate base (airport). At the subject airline, crew were positioned using company air services, train services and taxis. Positioning can create lengthy and complex journeys, as with this July 2004 positioning of a cabin crewmember (a German national):

From Orly (06:30)	by taxi (45 min) to	Charles DeGaulle
From Charles DeGaulle	To	Luton
From Luton	by taxi (90 min) to	NEMA
From NEMA	To	Cologne
From Cologne	by train (90 min) to	residence (arriving approx. 21:00)

(The cabin crewmember queried why the company was positioning him via this circuitous route when he could have made a more direct journey with a competitor airline.) Some crewmembers lived abroad (for example Eire) and commuted to UK bases. They usually put up in rented accommodation. One crewmember lived within a couple of miles of his base. Asked why he did not cycle to work he pointed out that this was difficult as he had to wear a uniform and carry a flight bag.

Attendance at management inquiries could also generate lengthy commutes: Violations of procedure could result in pilots being interviewed by senior flight safety managers. On one occasion, a Liverpool-based Captain and FO were delivered by taxi to the company HQ just outside London for interview.[9]

Report

Crew reported for duty at the airline's Crew Room. Crew Rooms varied in size. At one time, separate briefing rooms were provided. These were eventually removed in favour of open-plan spaces with pedestal tables for CRM briefings. Crew Rooms could be busy and noisy with incoming crews filing end-of-duty reports and the Base Administrator and Base Captain dealing with queries. Outgoing crews had to plan their duty in the midst of this activity. Crewmembers were required to report 1 h before their scheduled departure time. Some reported early (to do paperwork, for example). Crewmembers were rarely late. As incoming and outgoing crews mingled, they exchanged pleasantries and information (about the aircraft they had just brought in, for example). Jokes were sometimes told (perhaps to help expunge the memory of a troublesome duty). At the smaller bases, most crewmembers knew each other.[10] The atmosphere seemed friendly and positive.[11]

Errors surfaced at Report. On one occasion, there was no flight plan for the Captain. He had to telephone Operations to ask where it was. On another occasion, a FO was called in to cover for a colleague who had gone sick. The sick FO subsequently telephoned to say that he was fit for work, but Operations misinterpreted his communication. As the replacement was only able to fly two sectors, he was substituted on return to base by a third FO. The replacement commented: "Operations are not skilled enough at what they are doing". Crewmembers were sometimes made aware of roster changes at Report. Those asked to work a Standby[12] sometimes expressed disappointment at being called in to work, especially when they had made other plans.

Operational changes were sometimes caused by crewmembers' lifestyles. On one occasion a FO reported for duty having had a seemingly minor accident a couple of hours earlier (she had fallen from her horse). On landing at the first destination she stated: "I feel nauseous". The Captain asked: "Shall we take you off when we get back?" During the return leg, the FO was finding it difficult to reach switches on the overhead panel. The Captain assisted saying: "I'll do that". On return, the FO left the aircraft saying she thought she had cracked a rib. She claimed she had reported for duty to avoid being quizzed by management.

Planning

Crews planned operations (flights) in two parallel meetings. The flight crew (Captain and FO) convened to review the Flight Plan, weather, fuel uptake, etc., while the cabin crew (consisting of a Senior Cabin Crew Member (SCCM) and two flight attendants)[13] convened to discuss the duty and review safety procedure. The SCCM usually set her/his cabin crew a safety question (e.g., s/he would ask them what actions they would take in the event of a water closet smoke alarm activation?). Although exchanges were polite and convivial with

authority positions underplayed, the meetings had identifiable convenors/leaders (the Captain and SCCM, respectively).

The subject airline had a reputation for informality. One cabin crewmember drew a comparison with his previous airline, the Japanese flag carrier Japan Air Lines (JAL). He claimed that JAL's operations were governed by strict codes of behaviour with authority positions asserted. He had been required to learn the Japanese tea ceremony, a formalized and deferential routine.

Briefing

Most saw the CRM briefing as a key component of the pre-flight "work-up" (although even the most inexperienced crewmember seemed to know what was expected of her/him *before* the briefing).[14] While the majority of CRM briefings approximated the ideal-type,[15] there were exceptions. On a few occasions, there was no formal CRM briefing (although conversation was joined between crewmembers on "walk-out" to the aircraft). On one occasion, the CRM briefing was held in the airline's café area. Briefings held in discrete crew briefing rooms were easier to follow (partly because ambient noise levels were lower and because there were no physical distractions, like colleagues entering or departing the Crew Room, or printers, photocopiers or beverage vending machines operating). One briefing was curtailed because the pilots were having difficulty getting data for the flight (computer terminals were sometimes unserviceable).

"Walk-out" and aircraft preparation

The five members of a crew usually departed the Crew Room *en masse*.[16] There was polite behaviour. Doors were held open, for example. At the Crew Channel (reserved for airline and airport employees who were going airside[17]), flight and cabin crew passed through an archway metal detector and had their bags X-rayed. Failure to produce a valid company-issued airside pass meant they were denied access. It was the crewmember's responsibility to maintain a valid pass. Good-humoured banter was the norm during the security check and walk-out. At small airports, crews would walk to their aircraft whatever the weather. At large airports, a crew bus would be organized if the weather was bad. Things did not always run smoothly. If the walk-out commenced with the assigned aircraft still in-bound, the crew might have to wait on the ramp.[18] On one occasion, the crew walked to their assigned stand to find it vacant. The FO went to query the aircraft's non-arrival. He was told that the aircraft would land at 1233 hours. (It's scheduled departure time was 1225 hours.) The crew decided to take refreshment in a nearby passenger lounge. Here they articulated their frustrations to each other. The aircraft landed at 1225 hours. It took off ("rotated") at 1309 hours, 34 min behind schedule. Crews found it difficult to recover significant delays.

Sometimes in-bound and outbound crews met on the ramp. If they met in the aircraft, there could be up to 10 crewmembers on board, causing congestion. Information (on defects, for example) and pleasantries were exchanged. Sometimes defects had to be rectified. The following are examples of defects that caused major delays:

Case I: The flight crew detected a defect in the avionics. At 45 min after the engineers attended, the Captain instructed the passengers to return to the terminal. Deplaning took 15 min. At 5 min after deplaning, the engineers located and rectified the defect (a tripped circuit-breaker). The aircraft departed 32 min later. The flight had been delayed by over 90 min.[19]

Case II: During winter operations, 2001, an aircraft returned to its UK base 3 min ahead of schedule after operating a service to southern Europe. Its next service was to a UK regional airport (flying time 75 min). On this occasion, 50 min had been allocated for the turnaround. The aircraft had developed what was believed to be a minor hydraulic leak. Engineers were called. The leak worsened. At 3 min after the aircraft's scheduled departure time, the Captain was told that the aircraft was unserviceable. The crew and 140 passengers waited for a replacement aircraft. The replacement parked alongside at 19:40 hours. It rotated at 20:22 hours. Its scheduled departure time had been 18:50 hours.

Such episodes did not seem to impact crew morale. A collective "can-do" mentality seemed to galvanize crewmembers who worked together and with others (like Dispatchers, engineers and Air Traffic Controllers) to solve the problem.[20] Crewmembers made efforts to establish good relations with suppliers like Dispatchers, ramp workers, cleaners and fuellers. At smaller bases Dispatchers and others became known to crewmembers, and *vice versa*. Crewmembers were tolerant of suppliers' idiosyncrasies. At one Italian airport, for example, the fueller insisted that the flight crew descend to the ramp to sign his fuel sheet. The flight crew obliged. At other airports, fuellers would ascend to the flight deck.

Flight and cabin crew coordinated numerous agents (cleaners, fuellers, Dispatchers, ambulance drivers, etc.) to prepare the aircraft for service. Schedules and "slots"[21] created time pressures. These pressures were compounded by, for example, tardy passengers (a frequent occurrence), "no-shows" (a less frequent event), passengers obviously under the influence of drink and/or drugs and passengers allowed through the gate with outsize items that should have been directed to the hold. The following case studies serve as illustrations:

Case I: A group boarded late. They were unsteady on their feet and their speech was slurred. The cabin crew informed the Captain who used the public address system to warn that misbehaviour would lead to the aircraft being diverted to the nearest suitable airport where miscreants would be apprehended.[22] Thus, indulgent behaviour upstream (evidenced in a lack of rigour by check-in or gate staff) had to be handled downstream by crewmembers under

non-ideal conditions (within the confines of the passenger cabin, for example). Late-night services could be problematic, especially (a) if a delayed arrival had allowed passengers more drinking time and (b) check-in and gate staff had – perhaps because of intimidation or because they had allowed emotion to undermine judgement – failed to assess and filter passengers.

Case II: A passenger was allowed through the gate carrying a large, framed painting. Crewmembers persuaded him to part with it so it could be removed from the cabin, tagged and stored in the hold. This took diplomacy and tact. Crewmembers communicated and collaborated to solve a problem created upstream. Crewmembers' frustrations were later channelled into a formal incident report.

Pilots' pre-flight checks necessitated concentration and good communication. At this time, incursions on to the flight deck were not encouraged. As one pilot noted: "We try to stick to the briefing at the expense of everything else". Most flight crew endeavoured to encourage and help cabin crew. One SCCM, for example, was thought by one Captain to have a tendency to exaggerate problems. As he put it: "She has a habit of turning molehills into mountains". When the SCCM entered the flight deck, the Captain said to her (in a supportive tone): "Take your time". Having identified what he considered to be a potential problem he managed it through communication and encouragement. He used a teamwork approach.[23]

Sectors

Flight times for European sectors were rarely more than 2 h. Some duties consisted of flying four short sectors (London to Edinburgh twice, for example). With a flying time of around 60 min, such sectors required a high work-rate from both flight and cabin crew. Flight crew were expected to operate the aircraft as efficiently as possible (by minimizing fuel-burn, for example).[24]

The same operations were performed by the flight crew on each sector, whether short or long. Instructions were received from and requests made to air traffic controllers (in English, the *lingua franca* of commercial aviation).[25] One of the pilots flew the aircraft (the pilot flying (PF)) while the other (the pilot not flying (PNF)) handled radio communications and other tasks. The division of labour and the way in which tasks were to be performed were specified in standard operating procedures (SOPs). Checklists ensured that items were not missed (although on one occasion the flight crew went through a procedure from memory when the check-list could not be located). Pilots were required to "monitor and cross-check" each other's actions. For example, before take-off one pilot would announce, "Instruments synchronised and cross-checked", so the other was aware of the aircraft's status. If cleared to descend to, say, 10,000 ft, one pilot would announce, "Descend flight level one hundred" and set the altitude (by rotating a small knob adjacent to an LCD

display located on the front panel) while the other would monitor the action, then confirm its correct execution by saying "seen". Many actions were subject to cross-checking. Actions were co-ordinated and managed using a formal argot. When transferring control of the aircraft, for example, the pilot ceding control flagged this fact with the statement: "You have control". The pilot taking control confirmed the transfer with the affirmation: "I have control".[26] Problem-solving involved the co-ordinated, team-based application of experiential knowledge, intuition and individual skill, as can be seen from the following case studies:

Case I: The aircraft developed three intermittent faults: the engine anti-ice system[27] on the port (number one) engine became unreliable and the air-stairs[28] and auxiliary power unit[29] could only be made to work intermittently. Each problem was subjected to collaborative analysis and management (in the case of the engine anti-ice unit to the point of instructing the participant observer to monitor the engine anti-ice indicator lights located above and behind the flight crew (on the flight deck overhead panel)). Distributed cognition was seen to play a part in problem-solving.[30]

Case II: The autopilot malfunctioned on climb-out (a critical flight phase). On recognizing the problem, the Captain (who was monitoring) remarked "Watch it … " to the PF. The PF established manual control. (One Captain said that good pilots kept two questions uppermost in their minds – "What next?" followed by "What if?".)

Pilots were careful to ensure that they spoke to each other, ATC, cabin crew, Dispatchers, ramp-workers and fuellers in an unambiguous and audible manner. On one occasion, a Training Captain told a trainee pilot to speak up as he (the Training Captain) could not hear (and therefore monitor and respond to) the trainee's statements. As he put it: "I want to hear what you are saying".

One of the PNF's main tasks was to monitor the radio for the aircraft's call sign. A "missed call" could create difficulties for the crew and, *in extremis*, place their aircraft in jeopardy. Conversation on the flight deck would stop the instant the PNF or PF heard the aircraft's call sign on her/his headset. In the cruise, pilots spent their time doing paperwork (some referred to the flight deck as "the office"), getting the weather for alternate airports ("alternates") and monitoring radio communications and the aircraft's instruments.[31] Scanning the sky was not a priority (fast-flying aircraft are difficult to fix visually).

The PNF sometimes performed public relations duties. On one occasion, the SCCM asked the PNF to call ahead to re-schedule a car-hire pick-up for two passengers. Flight crew made time for conversation. Topics ranged from the economic prospects of the airline, careers and remuneration (favourite subjects) to the personal interests of the flight crew (cars, boats, permanent and holiday residences were favourite topics) to relationships with the opposite sex. Photographs of cars and partners were sometimes produced from flight bags. The participant observer was asked questions about his career and work.

Jokes were sometimes told (most often on the final sector with the intention possibly of keeping morale up and the flight crew fully alert) and humorous asides made. On one occasion, the FO, who was flying the penultimate sector, remarked: "Twenty-five minutes ahead … so if we get back late it'll be your fault, Captain [the Captain was to fly the final sector]". This caused some merriment. Occasionally a joke would run all day. Having completed the first sector of a five-sector duty, the FO remarked: "One down four to go". The Captain laughed. After completing the second sector, he remarked: "Two down three to go". The "count-down" continued through the day. This was the crew whose number one engine anti-ice unit had malfunctioned (a potentially serious defect). The defect was discussed with a certain *sang froid*. In response to the Captain's statement: "I'd say that valve is knackered [useless]", the FO responded: "It's not doing very well, is it?"[32]

Conversation on the flight deck was sparse when food was served (usually because by the time of its serving crews were hungry and thirsty).[33] With respect to service, cabin crew usually catered for passengers' needs first. Cabin crew did not serve a set meal. Rather, food and beverages were ordered by passengers. (Passengers could also order alcoholic drinks, perfumes, etc.). If the 148-seat aircraft was full, the three cabin crew were kept fully occupied. Sometimes there were accidents. Hot drinks could be spilled over passengers. By July 2004 (alleged) scalding incidents were running at 22 per month.[34] There were no allocated rest-breaks. Unlike those who work in offices, cabin crew are not able to stop work for a cup of tea or snack. Flight and cabin crew ate, drank, washed and went to the toilet when they could. Work patterns were determined by passengers' demands, operational requirements, defects, etc. Cabin crew earned sales commission. In July 2004 a flight attendant's starting salary was about £16,000.[35] With sector payments and commission, this could be increased to about £20,000. Captains were paid at least three times as much. Senior captains with management responsibilities were paid over four times as much.[36] Despite these differentials, relations between the front and rear of the aircraft seemed congenial and productive. There were kindnesses. One duty ended with a return to NEMA from Edinburgh. As this was a busy end to a long day, the flight crew usually turned down the cabin crew's offer of tea or coffee.[37] Occasionally, flight crew helped clean the cabin at turnaround (e.g., by carrying bagged debris from the aircraft to the ramp) or offered to make the cabin attendants a beverage.

Flight attendants provided the pilots with: bottles of water (the low humidity inside a pressurized airliner causes dehydration); cups of tea and coffee; sandwiches; and one hot crew meal. After the terrorist attacks of 2001, the airline installed lockable flight deck doors and CCTV monitors. Some claim that locked doors have served to reintroduce the "us and them" mentality that obtained before CRM.[38] Isolated on the flight deck, pilots made an effort to "gel" with colleagues and maintain morale.[39] Most pilots seemed sensitive to each

other's moods. On one occasion, a FO with a busy roster was called in from Standby to replace a FO who had fallen ill. Once installed on the flight deck, the replacement FO expressed his displeasure with the company and was noticeably quiet during the early stages of the first sector. The Captain broke the silence by talking to the participant observer. The FO eventually joined in the conversation. On the final sector, the FO was noticeably more communicative.[40] (Of course, had there not been a third person on the flight deck it is difficult to know how the Captain would have broken the silence. Possibly, he might have called for drinks and engaged the flight attendant in conversation.)

  Some flight crew volunteered their opinions on fatigue. One Captain, for example, who had agreed with his FO that he would fly the third sector of their four-sector duty lined up the aircraft for take-off, then forgot whose sector it was. He had risen for his previous day's duty at 0330 hours (his drive to base took over an hour). On reaching cruising altitude, he announced: "I am just absolutely f*ck*d. If I was honest and sensible I should have called in sick". On approach to the destination airport, he called "Flaps ten" when he should have called "Flaps five".[41] This Captain also volunteered: "Commercial aviation was one of the reasons my marriage broke down". Another Captain claimed that after completing five early starts he felt: "Bl**dy knackered [very fatigued]" (under a new rostering scheme introduced towards the end of the study, pilots could be asked to do five consecutive early morning duties. The new scheme was intended to avoid mixing early and late starts – a work pattern believed to cause excessive fatigue). The table illustrates a typical "early start" roster:

Day	Report time	Duty time (hh:mm)
1	06:00	10:25
2	06:10	7:25
3	06:00	10:25
4	06:00	10:25
5	06:10	7:25

  Another pilot commented: "Trying to have a life is difficult". Regarding early starts, a third Captain with over 30 years experience (on aircraft as varied as the Airbus A319 and Boeing 767) observed that some pilots resident in London rose at 0230 hours to report for early duties at London Gatwick. This Captain had decided to go part-time. When asked why he had decided this, his response was: "Because I am knackered [fatigued]". He continued: "On the fifth day [of the roster] everyone is hanging [tired]".

  Not all flight crew defined the job in these terms, however. One pilot who had worked in the financial services sector liked the job because, as he put it: "I don't take it home with me". Two others stated that they preferred short- to

long-haul because the high work-rate made the job more interesting and allowed them more time with their families.

Flight and duty times are regulated by the UK Civil Aviation Authority (CAA). Penalties for breaking these limits (and any other CAA standards) are severe. In relation to the current (2005) UK flight time limitation (FTL) of 900 h per annum, one senior Captain remarked that while this might be acceptable for long-haul operations (where significant periods of time were spent in the cruise), the FTL was less suited to multiple-sector, short-haul operations (where a specific duty period could see multiple landings and take-offs with relatively little time spent in the cruise).

Turnarounds[42]

By the end of the study, the subject carrier's target for turnaround was 20 min.[43] This required a high work-rate from both the flight and cabin crew.[44] Once the passengers had been disembarked, crewmembers tidied the aircraft cabin. Tasks included recovering, logging and storing items left by passengers (like cameras), bagging debris (newspapers, cups, spoons, sandwich wrappers, etc.), straightening seat-covers and lap-belts and stowing/replacing in-flight magazines. There was little time to rest or take refreshment. At one airport, a mobile crew shop would appear alongside the aircraft. Crewmembers would shop for themselves and colleagues. Those left on board would cover (by working faster). The cabin was cleaned in a co-ordinated manner.

Disembarkation/embarkation through both left-hand doors was the ideal. Using only one door (the front left-hand door – "L1") to disembark/embark passengers caused delay and frustration for cabin crew. The non-allocation of seats meant that most passengers took the nearest empty seat. This caused a bottleneck at the front of the aircraft. Requests from cabin crew for passengers to move through the cabin were usually ignored.

During his walk-around,[45] the pilot might converse with fuellers, rampworkers, security guards and others. Tasks involving the flight crew included agreement of the Load Sheet and fuel uptake. In theory, passengers were held at the boarding gate until the SCCM told the Dispatcher that the aircraft was ready. In practice, passengers were sometimes sent to the aircraft without the SCCM's permission.[46] This put cabin crew under pressure and inconvenienced passengers. Passengers could find themselves waiting on the jetway[47] or ramp. If they were obliged to wait on the ramp, they could get wet and cold. This could lead to complaints. On one occasion, passengers were sent to the aircraft without the SCCM's permission. As the cabin was still being prepared, they had to wait on the ramp for 8 min. Fortunately, the weather was benign.

Once on board, passengers stowed their carry-on items. Often more items were carried on than were permitted under the carriage regulations. This placed

cabin crew in a dilemma. Challenging all those who broke the regulations would cause delay. In the event that a passenger took issue with a flight attendant's request serious disruption could occur. Consequently, cabin crew exercised a collective discretion.[48] Occasionally, they would seek the Captain's advice (as when one passenger attempted to carry bag-pipes on to the aircraft and another carried his inflated soccer ball on to the aircraft (which could have exploded in the cabin when it was pressurized)). Wheelchairs and families with infants created further challenges. Besides boarding via the jet-way or by walking across the ramp, passengers could also be bussed to the aircraft. Using only one bus[49] increased time pressures. On some occasions, crews were required to change aircraft at turnaround. Some flight crew said that aircraft changes made it difficult to meet turnaround targets (even when the change aircraft was parked on an adjacent stand). Like passengers, crewmembers had luggage and clothing to carry.

End-of-duty routines

These began after the passengers had been disembarked. The flight crew completed two logs: the Journey Log and Technical Log ("Tech Log"). A copy of the former was taken to the Crew Room where it was either filed for the Base Administrator or FAXed to Head Office. The SCCM completed the Cabin Defect Log and acted as Purser. Once totalled and ledgered, the SCCM delivered the money to the Crew Room safe. Before disembarking, the crew handed the aircraft over to the cleaners and engineers. There were occasional humorous exchanges. About to disembark an aged and troublesome 737, the FO remarked to the engineer: "Take a can of petrol and a match and do us all a favour … ". The crew left *en masse* and either walked or took a crew bus. Three traits were noted. First, despite being fatigued, crewmembers seemed relieved, if not a little elated, at reaching the end of their duty. The mood lightened. There was humour. Some made calls to partners. Secondly, crewmembers invariably made an effort to help each other. Doors were held open. Offers were made to carry heavy bags. Crewmembers were supportive of each other. Crewmembers negotiated the Terminal together, still a team. Thirdly, everyone wanted to get away and home as quickly as possible.

  Back in the Crew Room, reports were filed and monies deposited. Some crewmembers checked their "drop files" for letters and memos. Few wished to remain for longer than was necessary, however. Many faced a similar duty the next day. Being somewhere else seemed to be a priority. There was a palpable sense of urgency.[50] Some of those based at Stansted lived in London. Sometimes the last train was missed. One Stansted-based FO lived in Stamford, Lincolnshire – a 140 mile round trip. Cabin crew usually departed before flight crew. Almost all crews un-formed on good terms.

Analysis

It is important to reiterate that this paper uses a narrow data set. Observations were made at a single low-cost airline over a specific period. These limitations may have a bearing on the applicability of the conclusions to other airlines or sectors. More research is required.

Conclusions

Work teams (each consisting of two pilots and three flight attendants) had to function in a complex, risk-laden and potentially uncertain environment. At the subject airline environmental factors included performance targets (management's turnaround and fuel-efficiency targets, for example), reward schemes (cabin crewmembers' partial dependence on sales commission, for example), roster instability,[51] technical malfunctions (the air stairs or APU failing, for example), operational failures (the non-availability of flight plans or computer terminals, etc.), supplier failures (the non-availability of buses, ground stairs or tugs, or refusal to help marshal passengers on the ramp or visit the flight deck, for example), difficulties with passengers (passengers' reluctance to consign outsize or valuable items to the hold or drunken behaviour, for example) and a volatile natural environment (that might necessitate a diversion and unplanned stopover). Other environmental factors included crewmembers' recurrent training and evaluation, absenteeism-reduction initiatives,[52] demands made by partners and other family members to see more of husbands, wives, fathers, etc.,[53] the aviation industry's volatility,[54] transport infrastructure inadequacies and failures, the escalating cost of renting or buying a property and fear of terrorism (perhaps in the guise of a man-portable surface-to-air missile launched at the airport perimeter).

Perhaps because of the complex, risk-laden and uncertain environment crewmembers cohered. Bonding began in the Crew Room *and continued throughout the duty*. Despite the clear chain of command (with the Captain at the apex), crewmembers interacted freely and tried, in varying degrees, to support and help each other. There was little evidence of individualist behaviour (as defined by Helmreich and Merritt, 1998). Crewmembers did not appear self-seeking. They did not appear to "consider the implications of their behaviour within a narrowly defined area of personal costs and benefits" (Helmreich and Merritt, 1998).

The atmosphere in the Crew Room and on the aircraft was generally informal and relaxed.[55] Statements and behaviours evidenced generally high levels of morale (although the onset of fatigue and/or stress towards the end of a duty could impact crewmembers' resilience, as could multiple problematic duties).[56] Such behaviours endowed work teams with a clear identity. To use Guzzo and Dickson's (1996) term, the two flight and three cabin crew became an "in-group". (Given the high levels of mutual support and empathy observed in

work teams, Helmreich and Merritt's (1998) term "collectivist in-group" might be more appropriate.)[57]

Use of the term "in-group" implies the existence of an "out-group". Interestingly, aircrew in-groups were not exclusionist. There was no pronounced "us-and-them" mentality. Mindful of the importance of good communication with, and coordination of suppliers, they cultivated the good-will of Dispatchers, engineers, fuellers, cleaners, ambulance drivers, security personnel, etc.[58] This served to extend and strengthen their sphere of control with the result that levels of uncertainty (for the crew) were lowered.[59]

In combination, the mutuality, cohesiveness, strong motivation and generally good morale of the crews seemed to make them more resilient. Crewmembers' positive outlook and "can-do" mentality enabled them to overcome most difficulties, whether human, socio-technical or natural in origin. This they did with a degree of humour (sometimes bleak in nature), which seemed to re-invigorate the team. Humour appeared to act as a coping mechanism or palliative. In his study of shipyard workers, Pickard (1989) wrote: "The [workmen's] cabins are personalised places … where the intimate, humorous and sometimes cruel banter takes place. Even in the most desperate circumstances a laugh was never long in coming". Eyre (1984) notes with reference to Mayo's Hawthorne experiment: "Social factors are of great importance at work. Both the behaviour and motivation of individual workers are effected by group relationships".

Cohesiveness, say Bartol and Martin (1998), is a function of group size (small groups are more cohesive), entry standards, the group's performance to date, the threat level ("… challenges to survival can provide a compelling reason for a group to pull together") and the degree to which members share the same attitudes and values. The relationship between cohesiveness and performance is not settled in the literature. According to Guzzo and Dickson (1996), for example, cohesiveness may serve to reduce performance. While noting that "… task cohesion can improve team decision-making under pressure", Guzzo and Dickson also state: "The topic of cohesiveness is still very much an unsettled concern in the literature …. Some evidence in the literature reviewed found … that group cohesiveness can contribute to performance [while] other studies found that structured task processes – such as the stepladder technique for group problem solving – can contribute positively to performance". According to Bartol and Martin (1998), cohesiveness is only an asset in groups with high standards of performance. In groups with low standards of performance, cohesiveness serves to maintain the *status quo*. As mentioned above, one of those involved in this study considered over-familiarity to be a potential threat to safety. This subject used the phrase "small base syndrome" to allude to the various dysfunctional behaviours produced (in part) by over-familiarity. He claimed that over-familiarity can lead to the accommodation of colleagues' misjudgements, errors and violations (a violation being the wilful infringement of a rule or regulation).

Bartol and Martin (1998) define organizational culture as "… a system of shared values, assumptions, beliefs, and norms that unite the members of an organisation. Culture reflects common views about 'the way things are done around here' ". There was some evidence of a crewing sub-culture. Some pilots were critical of management expectations regarding on-time performance, cost-effectiveness and rostering. Criticism could coalesce into an "us and them" world-view. It is reasonable to assume that work teams' cohesiveness and camaraderie did not serve to moderate whatever antagonisms existed. Helmreich and Merritt (1998) note: "[W]orking with the same group of people … can encourage the development of local norms …". Bartol and Martin (1998) state: "[A] culture can have a *negative* impact when the culture … influences behaviours in directions that do not further (and possibly interfere with) organisational goals". Eyre (1984) notes: "Work-groups are inclined to set their own standards of behaviour and their own levels of output, often in disregard of organisational requirements. Any member of a work-group who fails to conform is subject to sanctions applied by the group". Two pilots made derogatory remarks about their Base Captain, although the majority of criticism was aimed at the Chief Executive Officer. (It might be said that this is a general feature of the world of work.) One Captain remarked: "Camaraderie has been kicked in to touch [eroded] by that *ssh*le [CEO's name deleted]". Helmreich and Merritt (1998) state: "[A]n organisation consists of many subcultures based on profession, previous work history, location, … nationality …". The airline's CEO had never been a commercial pilot. It is possible that the crewing sub-culture reinforced work teams' cohesion.

The esprit-de-corps and supportive behaviours noted during the study should be seen in the context of the aviation industry's efforts to promote teamwork. One of the consequences of the introduction of more reliable technologies (like the turbojet engine with its single main moving part) was a foregrounding of the problem of human error in aviation. According to Campbell and Bagshaw (1999), the fact that "… the proportion of accidents ascribed to human error … remained constant in the order of 70%" gave cause for concern. This led to the development of the team-building protocol CRM (Burke *et al.*, 2003). CRM is applied in engineering, as with NASA's (reactive) uptake of CRM following the STS Columbia disaster (Harris, 2005). CRM is promoted by industry bodies like the Royal Academy of Engineering: "In the past a single person could understand and be in total control of operations. Today that is not possible and much more co-operation and sharing are required" (Turnbull, 2005). It should be noted that the high standards of teamwork observed in this study cannot be ascribed with confidence to CRM. Other factors, like the value system articulated at interview, workplace or professional culture, may have a greater impact. More research is required in this area (see below).

It can be concluded that, judged against the data reproduced above, Pomerantz's account is the more accurate. The data reveals an unglamorous world of

fatiguing rosters, delays, disruptions, convoluted positioning and difficult passengers. The study also reveals, however, crewmembers' professionalism, camaraderie and resilience. Teams formed extremely quickly and were, for the most part, successful in delivering a safe, efficient and friendly service – exactly the objectives of the subject airline.

Ideas for further research

Commercial aviation has gained a reputation for innovation in the field of risk management. Proven risk management systems, like anonymized incident reporting, have been copied by other industries (with varying degrees of success, it must be said).[60] It is assumed that CRM has had a positive impact on team performance and safety. Given that other industries are looking to CRM to improve their management of risk (BMJ, 2000; United Kingdom Department of Health, 2000), it is imperative that it be evaluated in a systematic fashion. Burke *et al.* (2003) explain the deficiency: "[A]fter 20 years of implementation the picture is not as clear as it should be. One reason for the lack of clarity is that researchers need more access …. [T]here needs to be a commitment to systematic long-term longitudinal studies that will serve to illustrate the impact that CRM training has on safety. It is particularly important that the aviation community heed this call *as other industries are adopting CRM practices based on some empirical evidence, but more frequently on anecdotal evidence* (my emphasis)". Brannick *et al.* (1993) have a more general criticism: "[L]ittle systematic research has addressed the process of team performance to understand the pattern of interactions among team members ….". CRM should be subjected to quantitative and qualitative evaluation, such that society can (a) understand its precise contribution to aviation safety and (b) judge whether CRM should be migrated to other domains (like health care).

In 1996, Guzzo and Dickson recommended that research be conducted "… to clarify issues of inclusion and exclusion by virtue of team boundaries …" (Guzzo and Dickson, 1996). Some years later, Wiley wrote: "[Effective captains extend] the boundaries of the team to include … gate personnel, ground personnel, maintenance and ATC" (Wiley, 2003). Given that crewmembers endeavoured to "enrol" service providers, it would be interesting to know (a) what impact this had on efficiency and safety and (b) whether such impacts might justify expanding the orbit of CRM training to include service providers.

Caulkin (2005) asserts: "Management [has a] reductive and narrowly economic view of human nature [that is] reflected in companies hierarchical controls and even more clearly in their reward systems …. Targets, incentives and performance-related pay aren't the best way of running companie's …. A fulfilling job allowing pride in the work, challenge and autonomy is … the best motivator". What is interesting about the subject airline is that its management used all these devices – targets, incentives, performance-related pay,

challenge and (relative) autonomy – to get its work teams to deliver the required level of service. Perhaps, our ideas about motivation need refining?

This study is very limited in scope. In order to broaden and deepen our understanding of one of the industry's most vital resources – aircrew – more studies are required. The industry should aim to develop a holistic profile of aircrew. Every sector should be examined, from the air taxi sector to cargo. Crucially, aircrew should be studied in *and out of work*, because workers' attitudes and behaviours are the product of both intra-organizational and extra-organizational factors. As Krausz (1969) puts it: "The life of the enterprise should not be studied entirely in system terms without reference to the structure of the wider society in which the enterprise exists". Goldthorpe is more succinct: "[T]he industrial sociologist cannot allow his investigation to end 'at the factory gates'" (Goldthorpe cited in Krausz, 1969).

Notes

1 Regarding the pressures that can bear down upon enterprises, Guzzo and Dickson (1996) note: "[E]nvironmental factors … include intraorganisational factors such as reward practices … as well as extraorganisational factors such as … customer demands and business environments".

2 Some airlines are using the Internet in an effort to restore the *status quo*, as with British Airways's use of its web site to provide "dynamic packaging" (the bundling of ticket sales with special offers on ancillaries like car hire) (Baker, 2005).

3 CRM is a team-building protocol that originated in the "… recognition … that teams are not automatically effective … " (Burke *et al.*, 2003). CRM furnishes aircrew with the skills and confidence to communicate up and down hierarchies, plan and co-ordinate activities and use whatever resources are available (human and technical) to solve problems. CRM assumes that: "[A] decision made by a group will be better in quality than the average decisions made by the members of the group" (Green *et al.*, 1996) and that: "[T]eam communication, cohesion, and coordination are all correlated with team effectiveness" (Brannick *et al.*, 1993). Burke *et al.* (2003) offer this summary: "CRM represents a human factors intervention which attempts to mitigate the effects of stress on performance through the promotion of teamwork".

4 There is evidence to suggest that CRM does not always live up to its promise (see, e.g., Barnes, 2004).

5 All the crewmembers observed in this study had undergone CRM training.

6 Block Time is the length of time between "push back" (the point at which an aircraft is pushed off stand) and "brakes on" (the point at which the aircraft comes to rest on stand at the destination airport). Duty Time is the length of time the crewmember is expected to be on duty for the airline (including the 1 h work-up prior to departure).

7 Both are large, long-haul aircraft with state-of-the-art avionics.

8 The 737-300 is a short/medium-haul aircraft with (in 2005) less sophisticated avionics than equivalent Airbus aircraft.

9 This was done on company time.

10 One company safety auditor (a retired senior pilot) claimed that familiarity could have a negative impact on safety with pilots accommodating colleagues' idiosyncrasies, errors and/or violations. The auditor used the term "small base syndrome" to describe such behaviour.

11 These behaviour traits were encouraged by the subject airline. Crewmembers were encouraged to be, in the airline's words, "up for it".

12 If called, Standby pilots must be able to commute to base within a certain time.

13 All the observations in this paper were made on board Boeing 737-300s, which carry two pilots and three flight attendants.

14 Ginnett (1989) observes: "[W]hen [crewmembers] come together, they step into a pre-existing "shell" … that predefines much of what is expected of them …. This shell includes … a set of expectations about the roles of each individual in the crew". It was noted that while the predefinition of roles substituted for Tuckman's forming and storming stages (Tuckman cited in Smither, 1988), it had not entirely substituted for the norming stage. Captains/FOs were seen to use the CRM briefing to establish boundaries and explain preferences (i.e. the CRM briefing performed a normative function). Bartol and Martin (1998) note: "The five stages of group development apply mainly to … relatively unstructured groups. They are less likely to appear in groups … with fairly well established operating methods or ground rules".

15 The "ideal-type" briefing is led by the Captain or FO, who makes the appropriate introductions, discusses the day's operations and asks the SCCM about her/his briefing. Mindful of the need to engineer a common view, the Captain/FO will clarify ambiguities and probe for and resolve misunderstandings. In the ideal-type CRM briefing, the Captain/FO invites questions from crew-members. Communication up and down hierarchies is encouraged (Ginnett, 1989; Krause, 1996; Wiley, 2003).

16 Occasionally, smokers would depart the Crew Room early to have a cigarette. Smoking was forbidden both in the terminal and on the ramp.

17 An airport has two "sides". Departing passengers check-in landside. Once in the departure lounge they are airside.

18 The ramp is a hard standing where aircraft are parked and serviced. Equipment dispositions and tasks are closely specified. Vehicles, for example, must be parked on the right-hand side of the aircraft (the service side). The ramp is a risk-laden environment that offers little protection from the elements (Bennett, 2002b; Bennett and Shaw, 2003).

19 There were two ironies in this incident. First, embarkation was completed a noteworthy 7 min before scheduled departure time. Secondly, this duty fell on the one-hundredth anniversary of the first powered flight. Some crewmembers were aware of these ironies.

20 A "can-do" mentality has been noted by others. See, for example, Maurino *et al.*'s (1995) analysis of the 1989 Dryden crash.

21 A slot is a take-off window allocated by air traffic control (ATC). A missed slot may cause an aircraft to be held by ATC.

22 Boyd (2002) comments: "[A]irline staff … may experience long-term contact with abusive passengers …. In these cases … staff could be considered "hostages" of abusive … customers …". A minority of passengers are nervous about flying (Bor, 2003).

23 Brannick *et al.* (1993) state: "[B]ehaviours that distinguished among more and less effective teams… included helping other members having difficulty, making motivating statements, praising other members, and suggesting ways to find an error …. [T]eam coordination and team cohesiveness were significantly correlated with team performance".

24 Flight crew used the flight management computer (FMC) to optimize their aircraft's performance.

25 Some air traffic controllers occasionally reverted to their native tongue – an added pressure for the subject airline's crews as they tried to maintain an accurate mental model of aircraft movements (see, e.g., Bennett, 2005a).

26 There is a paradox at the heart of flight operations. While many routines are pre-defined (on the Taylorist assumption of there being a "one best way" of performing a task (see, e.g., Taylor cited in Theobald, 1994)), the Captain retains her/his decision-making authority and is at liberty to abandon an SOP if s/he considers it wise. Pilots are therefore required to know when *not* to follow procedure. In flight operations, conformity is *contingent* upon circumstance and pilot judgement.

27 The anti-ice mechanism prevents ice building up around the engine intake. Ingested ice can damage engines.

28 The air stairs are the aircraft's integral passenger stairs. They have a complex action. Some operators de-activate or remove them.

29 The auxiliary power unit (APU) is a small jet engine (normally located in the aircraft's tail) that is used to generate power when the aircraft is parked.

30 Salomon (cited in Heath and Luff, 2000) offers this definition of distributed cognition: "People appear *to think in conjunction or partnership* with others and with the help of tools and imple-

ments [like avionics and quick reference handbooks (QRHs)] ... The thinking of these individuals might be considered to entail not just "solo" cognitive activities, but *distributed* ones". CRM exploits capacities and opportunities for distributed cognition.

31 The volume and nature of work to be done during a duty varied. Cooper *et al.* (2001) observe: "Both overload and underload can generate psychological (and physical) strain".

32 The teambuilding process – that is, the process of creating a unit of labour with capacities greater than the sum-of-parts – was a *contiguous* process that started in the Crew Room (as Ginnett (1989) noted in his "shell" model of team formation) and continued throughout the day in loci as varied as the flight deck, galley and ramp. Drivers included collaborative risk assessment, the taking and giving of advice, sharing the detail of one's private life and humour.

33 Sitting in a pressurised aircraft causes dehydration.

34 Claims of up to £2,500 were made against the airline.

35 The starting salary for a fast-food restaurant manager would be in the range £17,000 to £22,000. At least one of the cabin crewmembers used to work in a restaurant.

36 In May 2004, the maximum salary for non-probationary flight crew was: Captain – £64,000; Senior FOs – £39,000; and FOs – £32,000. Some flight crew had air force pensions. Writing about industry-wide salary levels, Calder (2002) observes: "[T]he average first officer is probably not going to get out of bed ... for less than £60,000 per year, and an experienced Captain would certainly be looking for £80,000". In the 2005 edition of *Social Trends* (Office for National Statistics, 2005), pilots were listed as the fourth highest earning professional group (ahead of solicitors, lawyers, judges, chartered secretaries and coroners).

37 According to Graduate Prospects (2002): "[Cabin crew work] is physically demanding .... Leave is often spent catching up on sleep ...".

38 See, for example, Krause (1996) and Bennett (2002a).

39 A few pilots expressed antipathy towards "management pilots" – those with wider company responsibilities. One FO said of a Base Captain: "If you are not as zealous as him you are not in his camp ... not 'one of us'".

40 According to Brannick *et al.* (1993) team cohesiveness is a function of "... the quality of interpersonal relations among team members".

41 For a more in-depth analysis of LCC flight crew fatigue, see Bennett (2003).

42 Turnaround is the process by which passengers are disembarked, the aircraft cleaned, luggage stowed and passengers embarked.

43 Flag carriers (like Air France) might allow 60 min (or more) to turn an aircraft around.

44 Guzzo and Salas (1995) claim: "[T]ime pressures and the work load placed on a team by its organisation appear to affect stress and performance".

45 The walk-around is the process by which flight crew verify the aircraft's airworthiness.

46 Coordination of activities within the aircraft was easy. On-board routines were familiar and practised and communication was unproblematic. Coordination of activities *without* the aircraft could be challenging.

47 The jet-way is an elevated covered walkway that links the departure gate to L1.

48 This downstream practice could be said to constitute a *common local norm*.

49 In July 2004, the UK's Liverpool John Lennon Airport, for example, had only one passenger bus.

50 Duties varied in length. While the *scheduled* duty time for NEMA-Venice-NEMA-Edinburgh-NEMA was 9 h and 45 min, delays could extend the duty day. Cooper *et al.* (2001) note: "Numerous studies have found a significant correlation between the overall number of hours worked and various indices of health and well being".

51 Research suggests that: "... lack of decision latitude and freedom to choose one's work schedule [are] significant predictors of the risk for coronary heart disease" (Cooper *et al.*, 2001).

52 One in-house journal for the airline's flight and cabin crew contrasted (de-identified) actual sickness rates with the company's target rates (the former could be higher than the latter).

53 As Cooper *et al.* (2001) explain: "[I]t is evident that inter-role conflict (in particular, between job and family demands) is a major stressor ...".

54 Cooper *et al.* (2001) comment: "With the increasing incidence of mergers and downsizing ... many ... face the threat of losing their jobs". According to Craig *et al.* (2005) in the 3 years fol-

lowing the 11th September 2001 terrorist attacks, the global aviation industry entered its "first true recession". In March/April 2005, Lufthansa purchased Swiss International Airlines, and the Canadian LCC Jetsgo ceased operations, laying off 1,350 employees. Eddington (cited in The Aerospace Professional, 2005) describes aviation's current milieu as one of "ultra-competition".

55 Applying Helmreich and Merritt's (1998) algorithm of hierarchy, subjects' interpersonal relations evidenced a low power distance.

56 Stress is now the most common cause of time off work in Britain (Laurance, 2005a).

57 In a spirit of "verstehen", the participant observer noted his own sentiments: being a member of a close-knit work team (albeit for only a single duty) was a positive experience. The work team's dissolution invariably provoked a sense of loss in the observer – a sense that something that had performed satisfactorily was being wilfully ended. In their review of the five stages of group development (forming, storming, norming, performing and adjourning), Bartol and Martin (1998) note: "During the adjourning stage group members prepare for disengagement …. While members may be pleased with completing their tasks, they may also feel some regret at the imminent disbanding of the group".

58 After one speedy turnaround, the Captain told the Dispatcher: "Thanks for a good turnaround, mate".

59 The management of uncertainty is one of the keys to safe and efficient operation.

60 In 2001, the UK Government established the National Patient Safety Agency whose mission was to "… encourage staff to report errors under a 'no blame' culture and … offer protection to those [staff] who feel threatened by colleagues" (Meikle, 2001). In November 2005, the UK National Audit Office (NAO) noted that despite the National Health Service's introduction of anonymised incident reporting, the organization was failing to learn from its mistakes. The NAO also found that because of the persistence of a "blame culture" in certain NHS Trusts, some staff were still reluctant to report errors (Laurance, 2005b).

References

Atkinson, P. (1990). *The Ethnographic Imagination. Textual Constructions of Reality*.London: Routledge.

Baker, C. (2005). BA drives more sales via the web. *Airline Business*, November.

Barnes, R. (2004). Follow Your Instincts. *Air Safety* 38, August,10–11.

Bartol, K.M. and Martin, D.C. (1998). *Management*. Boston: Irwin/McGraw-Hill.

Bennett, S.A. (2002a). Lock and Load? Explaining Different Policies for Delivering Safety and Security in the Air. *International Journal of Mass Emergencies and Disasters* 20 (2), pp. 141–169.

Bennett, S.A. (2002b). Ramping-Up Safety. *Focus on Commercial Aviation Safety* Summer (47), pp. 26–28.

Bennett, S.A. (2003). Flight Crew Stress and Fatigue in Low-Cost Commercial Air Operations – An Appraisal. *International Journal of Risk Assessment and Management* 4 (2), pp. 207–231.

Bennett, S.A. (2005a). Air Navigation Needs a Lingua Franca. *The Aerospace Professional*, July.

Bennett, S.A. (2005b). The Role of Social Amplification and News Values in the Representation of Risk Research: A Case Study. *Risk Management: An International Journal* 7 (1), pp. 9–29.

Bennett, S.A. and Shaw, A. (2003). Incidents and Accidents on the Ramp: Does 'Risk Communication' Provide a Solution? *Human Factors and Aerospace Safety* 3 (4), pp. 333–352.

Blogging at FL25 (2005). The Life of an Airline Pilot. *Blogging at FL250*. Reproduced at http://fl250.blogspot.com/2005/02/life-of-airline-pilot.html/ 9 November.

Bor, R. (ed.) (2003). *Passenger Behaviour*. Aldershot: Ashgate.

Boyd, C. (2002). Customer Violence and Employee Health and Safety. *Work, employment and society* 16 (1), pp. 151–169.

Brannick, M.T., Roach, R.M. and Salas, E. (1993). Understanding Team Performance: A Multimethod Study. *Human Performance* 6 (4), pp. 287–308.

British Medical Journal (2000). Editor's choice. Facing up to Medical Error. *BMJ* No. 7237, 18 March, p. 719.

Burgess, R.G. (ed.) (1982). *Field Research: A Sourcebook and Field Manual*. London: Unwin Hyman.

Burke, C.S., Wilson, K.A. and Salas, E. (2003). Teamwork at 35,000 feet: Enhancing Safety Through Team Training. *Human Factors and Aerospace Safety* 3 (4), pp. 287–312.

Calder, S. (2002). *No Frills. The Truth Behind The Low-Cost Revolution in The Skies*. London: Virgin Books Ltd.

Campbell, R.D. and Bagshaw, M. (1999). *Human Performance and Limitations in Aviation*. Oxford: Blackwell Science.

Caulkin, S. (2005). Happiness? Who needs it? *The Observer, Business Section*, 10 April, p. 9.

Centerprise Trust (1977). *A People's Autobiography of Hackney*. London: Centerprise Trust Ltd.

Cooper, C.L., Dewe, P.J. and O'Driscoll, M.P. (2001). *Organisational Stress. A Review and Critique of Theory. Research and Applications*. Thousand Oaks: Sage.

Craig, D., Evans, G. and Abraham, M. (2005). Surviving the Rebound. *Aerospace International* April, 32 (4): 36–39.

Doganis, R. (2005). Harsh Realities. *Airline Business* November, 21 (11): 77–81.

Eyre, E.C. (1984). *Mastering Basic Management*. London: Macmillan.

Gandt, R. (1999). *Skygods. The Fall of Pan Am*. McLean, Virginia: Paladwr Press.

Gilbert, N. (1993). *Researching Social Life*. Thousand Oaks: Sage.

Ginnett, R.C. (1989). Airline Cockpit Crew. In Hackman J.R. (ed.) *Groups That Work (and Those That Don't). Creating Conditions for Effective Teamwork*. San Francisco: Jossey-Bass Publishers, 427–448.

Graduate Prospects (2002). Air cabin crew in close-up. Reproduced at (2004) http://www.prospects.ac.uk/cms/ 3 August.

Greater Manchester Low Pay Unit (1995). *Workers' Voices: Accounts of Working Life in Britain in the Nineties*. Manchester: GMLPU.

Green, R.G., Muir, H., James, M., Gradwell, D. and Green, R.L. (1996). *Human Factors for Pilots*. Aldershot: Ashgate.

Guzzo, R.A. and Dickson, M.W. (1996). Teams in Organisations: Recent Research on Performance and Effectiveness. *Annual Review of Psychology* 47, pp. 307–338.

Guzzo, R.A. and Salas, E. (1995). *Team Effectiveness and Decision Making in Organisations*. San Francisco: Jossey-Bass.

Harris, P. (2005). Eileen leads way to the stars. *The Observer*, 10 April, p. 24.

Heath, C.C., Hindmarsh, J. and Luff, P. (1999). Interaction in Isolation: The Dislocated World of the London Underground Train Driver. *Sociology* 33 (3),, pp. 555–575.

Heath, C. and Luff, P. (2000). *Technology in Action*. Cambridge: Cambridge University Press.

Helmreich, R.L. and Merritt, A.C. (1998). *Culture at Work in Aviation and Medicine. National, Organisational and Professional Influences*. Aldershot: Ashgate.

Irwin, A. (1995). *Citizen Science*. London: Routledge.

Krause, S.S. (1996). *Aircraft Safety. Accident Investigations, Analyses and Applications*. New York: McGraw-Hill.

Krausz, E. (1969). *Sociology in Britain. A Survey of Research*. London: Batsford.

Laurance, J. (2005a). Stress is now most likely reason for time off work. *The Independent*, 8 April, p. 14.

Laurance, J. (2005b). NHS under fire as mistakes kill 2,000 patients in a year. *The Independent*, 3 November, p. 24.

Lawton, T.C. (2002). *Cleared for Take-Off. Structure and Strategy in the Low Fare Airline Business*. Aldershot: Ashgate.

Maurino, D.E., Reason, J., Johnston, N. and Lee, R.B. (1995). *Beyond Aviation Human Factors*. Aldershot: Ashgate.

McAllister, B. (1997). *Crew Resource Management. Awareness, Cockpit Efficiency and Safety*. Shrewsbury: Airlife.

Meikle, J. (2001). NHS agency will try to cut errors. *The Guardian*, 18 April, p. 26.

Office for National Statistics (2005). *Social Trend's*. Basingstoke: Palgrave Macmillan.

Pickard, T. (1989). *We Make Ships*. London: Secker and Warburg.

Pilling, M. and Field, D. (2005). Time Piece. *Airline Business* November, pp. 64–67.

Pomerantz, G.M. (2001). *Nine Minutes, Twenty Seconds. The Tragedy and Triumph of ASA Flight 529*. London: Michael Joseph.

Prospects.ac.uk (2005). Airline pilot in close-up. Prospects.ac.uk. Reproduced at http://www.prospects.ac.uk/ 9 November.

Smither, R.D. (1988). *The Psychology of Work and Human Performance*. New York: Harper and Row.

The Aerospace Professional (2005). Rod Eddington talks to the Aviation Club. *The Aerospace Professional*, November.

Theobald, R. (1994). *Understanding Industrial Society. A Sociological Guide*. Basingstoke: Macmillan.

Turnbull, J. (2005). *Executive Summary. Humans in Complex Engineering Systems. Sharing Good Practice Workshop*. London: The Royal Academy of Engineering.

United Kingdom Department of Health (2000). *An Organisation with a Memory. Report of an expert group on learning from adverse events in the NHS chaired by the Chief Medical Officer*. London: The Stationery Office.

Wiley, J. (2003). Uniting a Flight Crew. Air Safety. *Pakistan International Airlines* 37, September, 31–35.