

Supply chains and the manufacture of precarious work: The safety implications of outsourcing/offshoring heavy aircraft maintenance

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Supply chains, restructuring and OHS in aviation



Few industries could match aviation for pace and extent of change

- Government deregulation since 1980s
- Heightened competition throughout industry for market share
- Forcing corporate collapses and mergers
- Emergence of low-cost carriers
- Massive restructuring of flagship airlines
 - Corporate strategies
 - Labour market
 - Licensing and training reforms
 - Employment conditions
 - Changes in international safety regulation
 - Our focus here is on the supply chains that have emerged through outsourcing of maintenance work

Supply chains and OHS

- Sequence of contracts providing for good or service, commonly entailing elaborate webs of subcontracting at national or global level
- Limited research into OHS effects of supply chains (James & Walters, 2009, 2011)
- More substantial body of research on subcontracting and precarious work arrangements (often found in supply chains) has generally found significant adverse effects across range of industries (Quinlan & Bohle, 2008)
- Increasingly recognised by govt OHS agencies (eg Safe Work Australia, 2013) as priority issue
- Some efforts at regulatory controls, mostly voluntary but important exceptions (eg trucking Rawling & Kaine, 2012).

Supply chains and safety in aviation

- Sequence of contractual arrangements
 - Perform servicing and repairs on aircraft – especially labour-intensive heavy maintenance
 - Service parts
- Can create jobs, training opportunities, knowledge hubs, union organising potential etc,

but ...

- The Airline loses direct control of the maintenance process, which is now mediated by contractual arrangements in which the agent may have different interests to the principle
- Often multi-tiered and across borders – airline may not know where all work is performed
- Heavy maintenance is typically performed in countries where wages are low, union membership density and regulatory oversight poor or non-existent
- Airline not responsible for workload and time pressures, worker health and safety that contractual terms create
- Cost sensitivity at each link in chain acts as powerful brake
- Licensing, training, experience levels potentially compromised

The USA a 'cautionary tale'

Low cost airlines pioneered cost-cutting strategies

- Corporate restructuring
 - Many flagships setting up 'own competition'
- Increased outsourcing of maintenance to cheaper providers
- Between 1996 and 2008, major carriers increased proportion of maintenance outsourced from 37% to 64% (measured by cost) (Scovell, 2009).
- Understates the extent of the shift because:
 - lower cost of offshored maintenance,
 - major carriers' declining market share (which fell from 62% to 48% between 2000 and 2004)
 - increased use of code-sharing arrangements with regional/low cost operators.
- Code sharing, leasing aircraft
- Insecure workforce, agency labour
- 'Lean, mean' strategy attributed to customer desire for cheap travel
- Really about competition, volatility, restructuring

Incidents and Regulatory debate in the USA

- At least six and possibly seven (Atlantic SE airways F529 August 1994 lost propeller) major incidents between 1995 and 2009 involving US airlines (all LCCs), four involved fatalities, 163 killed in total)
- NTSB investigations revealed strong links between these and the risk factors associated with PDR model of work organisation (including outsourcing) effects on OHS (see next slide)
- Criticism of FAA (regulator) emerged from federal review bodies - Government Accountability Office (GAO) Office of Inspector General of the Transportation Department (OIG), NTSB and both House of Representative and Senate aviation subcommittees
- FAA slow to respond to negative findings
 - Inspectorate issues – not deployed in crucial areas, lack of enforcement, new systems not assessed re effectiveness
 - Uncertified work performed overseas without oversight
- Government moratorium placed on certification of new MROs
- 2012 FAA to oversee new rules for airlines doing overseas maintenance

Subcontracting risk factors and if identified in US incidents (*) or Australian survey/evidence (**)

economic/reward pressures on subcontractors

- greater work intensity (longer hours of work, rushing jobs etc) *,**
- employment features – short tenure, inexperience, low pay *,**
- safety-compromising practices (less maintenance, corner cutting on tools and materials)*,**
- e.g. fulfilment of terms of contract only – pressure to:
 - keep costs down, not report other faults found, deliver on time **

disorganisation

- poorer communication as chain more attenuated *
- safety systems not well articulated or too complex - e.g. manufacturer manuals in English *,**
- lower levels of training/induction/supervision *,**
- poor procedures – paper audits that bear little resemblance to reality *
- inability of workers to organise, workplace power and voice not strong **

failures in regulatory oversight

- gaps/inconsistencies in regulation *,**
 - inadequate enforcement, especially across borders *,**
 - inconsistent and lowered standards of licensing **
 - confusion and risk-shifting between parties *,**
 - under-resourced inspectorates that often struggle to develop appropriate enforcement strategies *,**
- (Quinlan et al 2013, Gregson et al 2015)

Regulation of Aviation Safety

- Global regulatory framework (International Civil Aviation Organisation (UN Chicago agreement 1944) with 192 signatories bound to keep regulations uniform with standards and procedures specified in annexes
- Annexes 1, 6 & 8 key to training and licensing of maintenance workers, airworthiness & issues critical to maintenance
- Problem - state compliance varies and difficulty knowing if offshore MROs meet international standards (FAA had some offshore inspectors but CASA only intermittently)
- 1998 Universal Safety Oversight Audit Program (USOAP) set up to audit national regulators (visits by arrangement) & issue ratings. National regulators could deny entry to airspace of planes from weak/non-compliant states
- Audits revealed fundamental weaknesses in safety programs in many states and significant differences in global safety standards (ICAO 2008)
- Surprisingly, auditing rate then declined & more use of 'self-report' paperwork monitoring (resourcing?). 2013 ICAO Safety Report average compliance level implementing "critical elements" of safety oversight only 61% across 96% of member states

Regulation of Aviation Safety continued

- Global Regulation regime also began to fracture
 - FAA taking more active role offshore
 - 2003 European Aviation Safety Agency (EASA) set up to consolidate aviation safety regulation across Europe, approving national regulators & MROs, so airlines could offshore maintenance to other European countries and has extended to other countries, including some in Asia-Pacific
 - FAA & EASA have offshore inspectors but insufficient & also inconsistencies (eg ICAO (serious concerns) & EASA audits (passed) of Thailand and different responses of USA and Europe re flights by Thai airlines 2015)
 - International Air Transport Association (IATA) of airline employers introduced International Operational Safety Audits (IOSA) claiming to treat ICAO standards as minima and its audits claimed standards of attainment that exceeded them. Unlike ICAO, FAA and EASA, IOSA audits individual airlines and seeking to position itself at the centre of safety regulation
 - Privatisation/outsourcing of some inspection activities by government (Quinlan et al 2014)

The Australian experience

- Australian Air Operator Certificate (AOC) holders are not required to report to any public agency when they offshore, so the extent or location of *offshoring* is unknown
- Legally offshoring must occur to a MRO 'approved' by CASA, and airline is responsible for subsequent outsourcing
- CASA approves Part 145 (Certification under ICAO) MROs in Australia and overseas
- Also does 'reciprocal approval' - Bilateral Aviation Safety Agreements (BASAs) – accepts approvals of other countries NAAs as long as they are 'ICAO compliant'
- Nature and volume of inspection not known but widely considered insufficient - trend to 'desktop audits' - not 'real' inspection of process
- Australia adopted EASA but has raised issues regarding whether the engineering licensing regime has actually been weakened by this (Hampson et al 2016 forthcoming)
- Regulatory gaps/inconsistencies illustrated by AirAsia flight 8501 crash into Java Sea in Dec 2014 (163 killed). CASA unaware of tail rudder issue. Not identified/remedied although plane did 78 Perth/Denpasar flights prior to this. DFAT warning not to fly on Indonesian internal airlines, Europe restricted Indonesian airlines to Garuda but CASA placed no restrictions on AirAsia

Creating vulnerability – the working conditions of aviation maintenance workers

- Historically combination of high skill, licensing/regulatory requirements and unionisation gave licensed aircraft maintenance engineers (LAMEs) considerable bargaining power in Australia and some other rich countries
- MROs vary in terms of focus (eg specialised or routine maintenance) & work conditions like hours, pay & job security
- In some rich countries with weak unions and decentralised IR regimes like USA more scope for cost cutting in MROs through labour saving/intensity
- Offshoring to poorer countries in Asia, South America etc offers considerable cost saving as lower wage levels, weak/no unions, weak and poorly enforced regulatory regimes, and in some (like Thailand and China) political regimes that actively repress unions. Labour costs in Brazil, the Philippines and China 10 to 50% lower than USA
- In-house maintenance faces competition from domestic & offshore MROs leading to pressure on hours, work intensity, other conditions & work practices including those affecting safety

Effects on Hours of Work of Maintenance Engineers in Australia

- 2012 survey of 708 AMEs & LAMEs
- 626 provided information on work patterns and working hours
- 68.7% were employees of main-route airlines (380 were from major carrier Airline A), 5.3% worked for regional airlines, 12.6% from General Aviation, 9.3% were from independent MROs and 4.1% in defence, education or equipment manufacturers.
- 70% worked shifts (fixed or rotating) of 11-12 hours over 7 day period
- Only 35% worked standard hours (35-39 per week), 62.1% worked 40 hours or more & 29.9% worked 45 hours or more
- 47.5% reported working overtime (mean 4.75 of which 3.65 paid) and seen as involuntary in many instances
- Long hours seen to have fatigue and work/family balance issues
- Indicative of labour over-utilisation at a time when industry experiencing large job losses

Hours usually worked per week – aircraft maintenance industry respondents, 2012

| Hours per week | Number | Per cent |
|-----------------------------------------|---------------|-----------------|
| Part time (34 hours or less) | 20 | 3.5 |
| Full time - standard (35 - 39 hours) | 205 | 35.4 |
| Full time – ‘stretched’ (40 - 44 hours) | 181 | 31.3 |
| Long hours (45 - 49 hours) | 111 | 19.2 |
| Very long hours (50 hours or more) | 62 | 10.7 |
| Total | 579 | 100.0 |

Long hours/night work and safety related decision-making

- Respondents referred to increased safety risks involved in shift work, especially night shift, advising that management should not schedule complicated, heavy tasks late at night because coordination and thinking was more impaired at that time.

I have personally seen incidents occurring due [to lack of] situational awareness, communication breakdown and fatigue. The employer blaming the employee for incidents and employer not looking at their own policies and employment numbers for task requirements. The airlines preach 'safety first' but still carry on doing the opposite (10242).

Increased supervisory pressure, additional rectification work and threats to security

- Professional commitment to standards amidst strong pressure to “do that bit extra” to fix numerous defects that should have been done during routine maintenance performed elsewhere. As one wrote:

They always threaten us saying how expensive it is and how cheap it is, the work done overseas. But they don't see that the aircraft that undergo an overseas check has so many defects that we have to fix during the next maintenance check that we do, so then it takes longer for us to fix things that the overseas people should have fixed. We are always under pressure to meet unrealistic deadlines to match what overseas MRO do (10375).

Conclusion

- To understand precarious work and its effects need to examine drivers that promote precariousness like global supply chains, outsourcing/offshoring and subcontracting
- Outsourcing/offshoring maintenance key driver for creating categories of precarious workers as well as undermining the conditions of ostensibly non-precarious workers. Precariousness better seen as a spectrum not just category.
- Precariousness not confined to low paid/low skill work. Even highly skilled and unionised workers like maintenance engineers affected
- Aviation maintenance outsourcing highlights how supply chains can effect both safety of workers and others (eg clients/customers)
- Finally, raises issue of regulating labour standards & safety in global context (political contexts & OHS regimes do matter) and difficulty regulating even where framework in place and public safety concerns

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