

Hart Solutions LLC

Overzealous Criminalization: Adverse Effects on Safety?

Christopher A. Hart
Former Chairman of the
U.S. National Transportation Safety Board

Presentation to Eurocontrol

October 27, 2020



The Problem

- Most accidents involve inadvertent error by good people trying to do the right thing under sometimes difficult circumstances
- Most criminal statutes require specific intent to harm, inadvertent error is not enough
- Nonetheless, post-accident public outcry and political response: ***PUNISH!***



The Challenge

- Intentional wrongdoing *should* be punished
- Issue: Does criminalization help prevent *inadvertent* error?
- Difference of objectives:
 - Purpose of criminalization is *punishment* for intentional wrongdoing
 - Purpose of safety investigation is finding out why mishaps occur and *preventing them from happening again*



Potential Undesirable Results of Overzealous Criminalization

- Actual or threatened criminalization:
 - Discourages participation in proactive information programs
 - Hinders safety accident investigations and efforts to prevent recurrences
 - Eliminates investigation transparency
 - Reduces the likelihood of addressing *system* issues
 - Is often a lose-lose because criminal proceedings cause all of the above problems even though they are often “unsuccessful” due to lack of requisite intent

Strasbourg, France

–Risk factors

- Night, mountainous terrain
- No ground radar
- No ground-based glideslope guidance
- No airborne terrain alerting equipment



–Sophisticated autopilot

–Autopilot mode ambiguity

Human Factors Challenge

- “3.2” in the window, *with* a decimal, means descend at a 3.2 degree angle (about 700 fpm at 140 knots)
- “32” in the window, *without* a decimal, means descend at 3200 fpm
- Clue re potential problem: Quick changes in autopilot mode suggest mode selection error
- Flight data recorder readout program could have helped safety experts address this problem proactively, before a crash

Criminal Charges: Acquittal

- Manslaughter charges brought against representatives from the air navigation service provider, the airline, and the French BEA (aviation safety agency)
- Compensation ordered, but all six defendants acquitted of criminal charges

Example: Concorde, 2000

– Chain of Events: Takeoff from Paris CDG

- Tire shredded after rolling over piece of metal from previous (Continental Airlines) airplane
- Tire fragments punctured fuel tank
- Plane caught fire, crashed, fatal to all 109 in airplane, 4 on ground
- Involuntary manslaughter charges brought against Continental Airlines, two Continental mechanics



Outcome

- French appeals court cleared Continental Airlines of criminal charges
- Court also dropped charges against the two Continental mechanics
- Issue: Requisite intent by mechanics?

Criminal Prosecution Does Not Address System Issues

- Robustness of connection for part that fell off?
- Mechanics fatigued, distracted, impaired?
- Training of mechanics adequate?
- Work environment suitable?
- Necessary tools available?
- Parts inventory adequate?
- Adequacy of airport FOD procedures?
- Other?

Another Example: GOL, 2007

– Chain of Events, Flight from Brazil to New York

- Embraer eastbound, FL370 (per international convention)
- Route turned westbound at waypoint
- Go to even thousand (FL 380 or 360) per international convention?
- Pilots tried to contact controllers, unsuccessful, remained at FL370



GOL (con't)

– Chain of Events

- For unknown reasons, Embraer transponder was on “Standby” for about an hour prior to the collision, hence
 - Embraer was invisible to ATC
 - It was also invisible to Traffic Collision Avoidance System (TCAS) in eastbound airliner at FL370
- Airplanes collided, airliner crashed, fatal to all 154 on board, damaged Embraer landed safely at nearby airport

Outcome

- Two Embraer pilots, four air traffic controllers charged with “exposing an aircraft to danger”
- Embraer pilots sentenced to 4 years, 4 months in prison, commuted to community service to be served in the US
- One controller sentenced to a prison term of up to 3 years, 4 months, eligible to do community service in Brazil
- Possible theory: Pilot’s foot on footrest accidentally hit transponder “Standby” button, no obvious indication that transponder was not transmitting
- Requisite intent by pilots or controllers?

System Issues Addressed?

- Adequacy of ATC surveillance equipment and processes?
- Adequacy of warning to ATC re “disappeared” airplane?
- Adequacy of ATC communications capability?
- Adequacy of ATC staffing?
- Design of transponder controls?
- Adequacy of warning to pilots re transponder not transmitting?
- Other?

Initially Unclear if Criminal? TWA 800

- Explosion of center-fuselage fuel tank, fatal to all 230 on board
- Immediate speculation re missile
- FBI or NTSB in charge?
 - FBI in charge: No public disclosure of evidence, criminal investigation comes first
 - NTSB in charge: Daily public disclosure of evidence
- Difficult to determine validity of missile theory until pieces recovered and assembled
- NTSB probable cause: Explosion, due to internal spark of unknown origin, of nearly empty fuel tank that was already heated near flash point



Result: FBI/NTSB MOU

- Presumption that accident was caused by inadvertent error rather than criminal wrongdoing, so NTSB will lead investigation unless clearly criminal (e.g., 9/11)
- If NTSB investigation uncovers criminal activity, NTSB will ask FBI to lead, then NTSB will provide technical assistance as requested

Effect on Criminalization of Two Major Human Factors Challenges?

– Ongoing

- Pilots encountering problem that they have never seen before, even in training
 - Turkish Airlines, Amsterdam (2009)
 - Rio to Paris (2009)
 - Asiana, San Francisco (2013)
 - 737MAX (2018-9)
 - Exception: Landing in the Hudson River (2009)
 - Exception: Hydraulic failure, Sioux City, IA (1989)
- Exacerbated by automation becoming more complex and more reliable

– Future

- Expecting highly trained, highly skilled pilots to become mere monitors as automation becomes increasingly capable

Conclusions

- Few would argue against criminalization of intentional wrongdoing
- Overzealous criminalization, however, may adversely affect safety improvement efforts
- Successful in the U.S.: Primacy of safety investigation, criminal enforcement only evidence of intent to harm
- Needed: Model Policy, developed collaboratively – but not in the heat of battle – by all who are involved in the process, regarding best ways to address important and sometimes competing interests

Thank You!!



Questions?

Christopher A. Hart
Hart Solutions LLC
chris@hartsolutionsllc.com
202-680-4122