

HUMAN FACTORS IN HUMANITARIAN AVIATION

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Inflight, Cabin & Operational Interfaces

For operators supporting WFP and United Nations missions

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What We Will Explore

Human performance across the humanitarian mission

- Human factors beyond “human error”
- Threats unique to WFP and UN-supported operations
- Why competent crew still make errors
- CRM across flight deck, cabin, OCC, ground and client interfaces
- Communication, assertiveness and authority gradient
- Fatigue, stress, workload and situational awareness
- What management must do to strengthen operational resilience

Human factors is a system issue, not only a crew issue.

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Human Factors: More Than 'Human Error'

- People operate within systems, procedures, equipment, environments and organizational expectations.
- Competent people can make predictable errors when conditions degrade performance.
- The objective is not perfect humans. It is strong defences, timely detection and effective recovery.
- In humanitarian aviation, the system extends beyond the aircraft to dispatch, ground handling, security, client coordination and field operations.

People are part of the safety system, not a problem to be designed out.

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Threats unique to WFP and UN-supported operations

The mission is important. The operating environment is unforgiving.

- Remote destinations with limited infrastructure and support
- Rapidly changing weather, security, access and operational constraints
- Time-sensitive passenger, cargo, medical and relief missions
- Multi-agency interfaces: operator, client, ground teams, security, dispatch and local authorities
- Long rotations, disrupted rest, multiple sectors and changing schedules
- High mission commitment can unintentionally create pressure to “make it happen”

Mission urgency must never become operational urgency.

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Threat & Error Management in Humanitarian Operations

THREATS

Weather
Terrain
ATC errors
Remote airfield
Culture
Security change
Delay
Fatigue
Manifest/load change

ERRORS

Missed checklist item
Poor handover
Incorrect assumption
Communication gap
Rushed decision

UNDESIRE STATE

Cabin not secure
Incorrect load data
Reduced fuel margin
Crew behind operation

RECOVERY

Recognize
Communicate
Stop / stabilize
Correct
Reassess

Good teams identify threats before those threats create errors.

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The SHELL Model in a Humanitarian Mission

Performance is shaped by the interfaces around the person

SOFTWARE

SOPs • checklists •
mission instructions •
NOTAMs • security
procedures

HARDWARE

Aircraft • cabin equipment
• loading equipment •
communications

ENVIRONMENT

Remote airfields • heat
• dust • weather •
security • noise

LIVEWARE

Crew • passengers •
ground staff • client
teams • local partners

LIVEWARE: YOU

Training • experience • fatigue • stress
• expectations • decision-making

Ask: Where are the mismatches today?

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Humanitarian Operations: Where Interfaces Fail

CLIENT ↔ OPERATOR

Mission request
Schedule pressure
Passenger/cargo
changes
Acceptance criteria
Escalation

AIR ↔ GROUND

Manifest/load
Fuelling
DG
Boarding
Turnaround
status

BASE ↔ FIELD

Security
Weather
Airfield status
Resources
Handover

FLIGHT CREW ↔ CABIN CREW

Communication
break down
Preflight and post
flight briefing
Wrong Normal
/emergency call
outs
Authority Gradient

Most operational surprises arrive through an interface.

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Why Competent Crews Still Make Errors

- Attention is limited and competing mission tasks can capture it.
- Interruptions can break checklist flow and memory.
- Familiar routes can create expectation and confirmation bias.
- Delays and pressure can encourage shortcuts or task shedding.
- Fatigue, heat, stress and disrupted rest reduce vigilance and judgement.
- A strong desire to complete a humanitarian mission can bias a go/no-go decision.

Error becomes more predictable when we understand the conditions surrounding performance.

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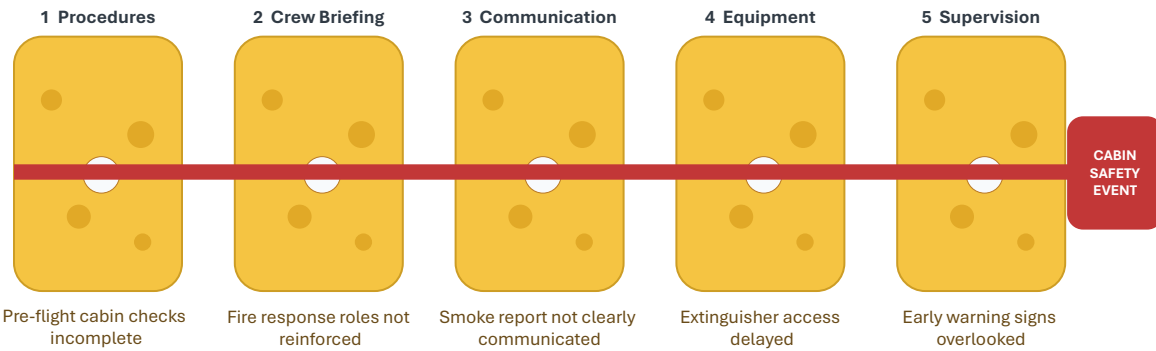
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Swiss Cheese Model: An incident occurs when weaknesses in several safety barriers align.

Cabin Safety Example.

Scenario: Humanitarian flight to a remote airfield • high workload • short turnaround • multilingual passengers • smoke develops into a cabin fire



Key message: A cabin fire rarely becomes serious because of one failure. It escalates when several defenses fail or are weakened at the same time.

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CRM across flight deck, cabin, OCC, ground and client interfaces

- Flight deck: aircraft state, weather, fuel, performance and flight path
- Cabin: passenger behaviour, injuries, smells, sounds, compliance and cabin condition
- OCC/dispatch: route, alternates, permits, flight watch and operational changes
- Ground teams: load, dangerous goods, passenger handling, fuelling and turnaround
- Client/field teams: mission priorities, manifests, movement coordination and local constraints

CRM turns separate expertise into shared situational awareness.

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Communication: Make Information Actionable

VAGUE

“There is a problem with the passengers / load .”

ACTIONABLE

“Captain, manifest changed by 12 passengers after final load figures. Boarding paused. Load control is recalculating before doors close.”

Closed loop: Message → Acknowledgement → Confirmation

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Assertiveness & Authority Gradient

Humanitarian purpose does not override safety responsibility

- Respect command and client roles, but do not surrender professional responsibility. (operational control remains with the operator)
- State the concern clearly, then state the operational or safety consequence.
- Repeat and escalate when the risk remains unresolved.
- Use established channels when client expectations conflict with safe operation.
- Leaders must make speaking up normal, especially for junior, local and contract staff(Non-punitive reporting)

A silent team is not necessarily an aligned team.

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Fatigue Workload and situational awareness

Fatigue in Rotational & Field Operations

- Early departures, night operations and circadian disruption
- Multiple sectors and cumulative duty
- Schedule changes, positioning and extended wakefulness
- Unfamiliar accommodation, noise, heat and interrupted rest
- Long deployments and reduced recovery opportunities
- Fatigue can reduce vigilance, communication quality, reaction time and judgement

Fatigue is an operational risk to be managed, not a test of commitment.

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Stress, Workload & Task Saturation

BEFORE FLIGHT

Permit or schedule changes
Manifest changes
Cargo / baggage issues
Security updates
Weather and alternates
Time pressure

DURING FLIGHT

Passenger needs
Turbulence
Medical events
ATC / weather changes
Cabin issues
Operational diversions

CREW RESPONSE

Prioritize safety
Slow the operation
Redistribute tasks
Communicate capacity
Use checklists
Ask for support

What must be done now, what can wait, and who else can help?

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Situational Awareness: Stay Ahead of the Mission

1. WHAT?

What is happening now?
Aircraft • cabin • weather •
security • load • passengers

2. SO WHAT?

What does it mean for the
safe continuation of the
flight?

3. WHAT NEXT?

What is likely to change?
What decision point is
approaching?

Good crews continuously update the shared mental model.

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The Pre-Flight Briefing Is the First Risk-Control

- What is different about today's mission?
- Airfield and alternate routes, weather, security
- Passenger profile, special needs, medical cases and movement restrictions
- Cargo, dangerous goods, baggage and loading considerations
- Crew experience, fatigue, roles and communication expectations
- Triggers that would make us stop, delay, divert or escalate

A briefing is not a ritual. It creates a shared mental model.

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Management and safety culture shape frontline performance

Human Factors Beyond the Aircraft

- Realistic schedules, procedures and staffing for field conditions
- Clear operator-client boundaries and escalation pathways
- Fatigue risk controls that reflect rotations and disrupted rest
- Training based on realistic humanitarian scenarios
- Reliable reporting from site managers and remote bases
- Learning from incidents, observations, audits and normal operations
- Leaders who reward disciplined SOP use, challenge and stop-work decisions

If the same error keeps recurring, look beyond the individual. (Systemic failures)

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Management of Change: Human Factors Before Deployment

- New country, route, client, aircraft, base or mission profile changes the risk picture.
- Assess people, procedures, equipment, infrastructure, training and interfaces together.
- Identify new workload, fatigue, communication and competency demands.
- Define controls, owners, timelines and evidence before operations stabilize.
- Review whether controls work after deployment, not only whether they were completed.

Change is safest when operational reality is tested against assumptions.

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Practical Controls Operators Can Strengthen

- Use a mission-specific threat briefing, not only a generic crew brief.
- Create a clear “stop and stabilize” expectation when information changes late.
- Protect final load, manifest and cabin-secure confirmation from interruption.
- Include client and ground interfaces in CRM training and occurrence reviews.
- Track fatigue, unstable schedules, repeated delays and line-station pressures as safety data.
- Exercise diversions, medical events, security changes and degraded-support scenarios.

Resilience is built before the abnormal event.

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THREE THINGS TO TAKE BACK TO THE OPERATION

1. EXPECT HUMAN LIMITATIONS

Design the mission so ordinary human limitations do not become safety events.

2. SHARE INFORMATION EARLY

Across flight deck, cabin, OCC, ground and client interfaces.

3. BREAK THE CHAIN EARLY

Slow down, speak up, stabilize and recover before threats combine.

Humanitarian purpose and aviation safety are not competing goals. Safe operations are what make the mission sustainable.

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CLOSING THOUGHT

**“The mission may be urgent.
The operation must remain disciplined.”**

Understand human limitations • share information • manage pressure • break the chain early

QUESTIONS & DISCUSSION