Basic Performance of Flight Crew

Lufthansa Flight Safety Project (’97-’99)

- Analysis of Flight Safety
- Development of preventive measures
- Anonymous survey handed out to all pilots

More than 2000 pilots participated describing:
- Safety related situations
- Contributing factors
  - Technical
  - Operational
  - Human Error
  - Social (interpersonal)
Basic Performance of Flight Crew

Lufthansa Flight Safety Project (’97-’99)

Social (interpersonal) Factor:
- Communication quality
- Information management
- Crew atmosphere
Basic Performance of Flight Crew

Lufthansa Flight Safety Project (’97-’99)

<table>
<thead>
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<th>Group</th>
<th>Percentage</th>
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</table>
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Results:

The social or interpersonal factor
- is usually not endangering the crew performance during normal operations
- can have significant negative effects when crews have to deal with operational or technical problems
- can hinder crews in resolving human errors

Needs to be addressed in training!
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Consequences:

Flight Crews must be competent in all areas:
Basic Performance of Flight Crew

![Diagram of Competences and Elements]

Competences
- Technical
- Procedural
- Interpersonal

Elements
1. 2. 3.

Descriptions
- Detailed descriptions for each element related to competences.
Basic Performance of Flight Crew

- Manual Airplane Control
  - ...

- Knowledge of Systems
  - ...

- Use of Automation
  - Be able to manage all modes of automation
  - Use optimum mode of automation
  - Use automation to reduce workload
  - Be aware of active mode of automation
  - Be aware of mode changes
  - Be flexible in changing level of automation
Basic Performance of Flight Crew

Knowledge of Procedures

- Know normal procedures for all phases of flight
- Be thoroughly familiar with all relevant standard operating procedures
- Know how to handle an abnormal situation
- Know memory actions by heart
- Be familiar with relevant abnormal procedures

Adherence to Procedures

- Strictly apply required published procedures
- Perform procedures disciplined and accurately
- Deviate from procedures only if a higher degree of safety is achieved
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- Communication
  - Atmosphere
  - Information Transfer
  - Information Management

- Leadership and Teamwork
  - Command Ability
  - Team Ability
  - Conflict Management

- Workload Management
  - Task
  - Time
  - Stress and Error

- Situation Awareness and Decision Making
  - ...
Basic Performance of Flight Crew

- Communication
  - Information Transfer
    - share information
    - assure reception
    - assure understanding
  - Information Management
    - clearly state plans and intentions
    - announce ambiguities
    - announce uncertainties
    - speak frankly about problems within the crew
Basic Performance of Flight Crew

OM-A

- To assure a safe and efficient operation, each flight crew member must be proficient in three areas of competence: technical, procedural and interpersonal.

- Each area consists of vital elements. Optimum overall performance is achieved by integrated application of these elements.
Basic Performance of Flight Crew

Basic Competence for Optimum Performance

**Technical Competence**

1. **Manual Aeroplane Control**
   - Crew members must be able to control the aeroplane in all maneuvers. They endeavor to make the flight as accurate and smooth as possible.

2. **Knowledge of Systems**
   - Crew members must be familiar with special emphasis on operational limits and interaction of systems.

3. **Use of Automation**
   - Crew members are proficient in operating their aeroplane in all modes of automation. They have the facility needed to change from one level of automation to another.

**Procedural Competence**

1. **Knowledge of Procedures**
   - It is essential for crew members to be thoroughly familiar with published procedures.

2. **Adherence to Procedures**
   - Discipline and accurate application of procedures is vital. Only if a higher degree of safety is achieved, deviation from standard procedures might be necessary.

**Interpersonal Competence**

1. **Communication**
   - Clear, effective communication includes information transfer and social aspects. Crew members share information, and precise language is used.

2. **Leadership and Teamwork**
   - Leadership by the commander, the crew achieves a safe and efficient performance in a climate that is rational and free of intimidation. Social interaction among crew members is managed and coordinated.

3. **Workload Management**
   - Crew members operate operational tasks and distribute them appropriately. Avoidance of mental and physical resources are used to accomplish task completion in good time. Stress and error are inherent factors of flight, and crew members aim to minimize their negative effects.

4. **Situation Awareness and Decision Making**
   - Crew members recognize and anticipate factors affecting the flight. After these factors are evaluated, they choose the appropriate course of action. To achieve a favorable outcome, crew members actively monitor execution and development of the situation.
Is all this required by law?

Regulatory Framework acc. Appendix 1 to JAR–FCL 1.240 & 1.295 (Excerpt):

Height
- Generally +/- 100 feet
- Starting a go-around at decision height + 50 feet/-0 feet
- Minimum descent height/ altitude + 50 feet/-0 feet

Tracking
- on radio aids +/- 5°
- Precision approach half scale deflection, azimuth and glide path

Heading
- all engines operating +/- 5°
- with simulated engine failure +/- 10°

Speed
- all engines operating +/- 5 knots
- with simulated engine failure +10 knots/-5 knots

Only part of the picture!
Basic Performance of Flight Crew

Conclusion:
- Proficiency required in all 3 areas
- Detailed descriptions required for effective training and checking
- Definition of requirements more important than definition of training situations

THANK YOU!