



IHST

International Helicopter Safety Team

Our Goal is to Reduce the Civil Helicopter Accident Rate by 80% by 2016.

Training Fact Sheet – Maneuver Initiation Envelope

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Gaining Control Over Loss-of-Control Accidents

The Maneuver Initiation Envelope (MIE) can be used as a mental model to protect helicopter pilots from getting involved in loss-of-control accidents caused by carelessness in not ensuring safety elements are within their respective envelope. These safety elements must be contained within their respective envelopes prior to pilots commencing any performance maneuver. As history reveals, maneuvering flight can turn sour, because pilots rush into maneuvers, before carefully considering each element revealed in the MIE.



IHST analysis reveals that over 20% of all helicopter accidents occur during maneuvering flight. A contributing factor in many of these cases is where pilots have initiated performance maneuvers without knowing all safety elements are properly contained within their respective boundaries.

As with any flight envelope, it's imperative for pilots to place their "stamp of approval" on all the safety elements, before initiating any flight maneuver. Pilots who check and double check that each element is properly considered are more likely to experience positive results compared to those who do not take into consideration such critical factors.

Safety Elements of the MIE

The MIE identifies (7) safety elements pilots should consider prior to initiating any performance based maneuver. These safety elements address both internal and external factors effecting the safety of flight. The (7) elements are:

- Aircraft Limitations.
- Operational Limitations.
- Weather.
- Air Traffic Control (ATC) Goodwill.
- Practical Test Standards (PTS).
- Human Factors (HF).
- Terrain.

These safety elements are dynamic and constantly challenge pilots to maintain a keen sense of situational awareness at all times. It is super critical for pilots to always be aware of situations that can change any of these safety elements, whereby breaching the safety confines of the MIE.

Tools for staying in the Envelope

Having the right tools for safely conducting any flight maneuver is important. The following tools can help pilots start and stay within the MIE for improving overall safety.

- Thorough Pre-Flight.
- Disciplined use of checklists.
- Acronyms/memory joggers.
- Aircraft systems knowledge.
- Experience/airmanship.
- Practical Test Standards (PTS).
- Resource Management.

Benefits from Starting and staying in the Envelope

A reasonable question one can ask are what benefits are gained from starting a flight maneuver within the MIE? The short answer reflects the critical importance of fundamentals. Starting any flight maneuver with proper fundamentals increases the chance of success several fold, plus provides the pilot with a greater margin of safety. Other benefits include:

- Positive aircraft control (at all times).
- Prevent aircraft damage from exceeding limitations.
- Prevent exceeding personal limitations.
- Increase situational awareness (SA).
- Improve Aeronautical Decision Making (ADM).
- Reduce pilot workload (less stress).
- Increase systems knowledge.
- Improve professionalism.

Considerations when outside the Envelope

The MIE places great emphasis on the importance of a proper setup prior to initiating a maneuver. Pilots who are methodical and systematic in setting up for a maneuver, are more likely to complete the maneuver within limits, within standards and without heroic effort.

Unfortunately, there are situations in which pilots knowingly and unknowingly allow their helicopters to veer outside the MIE without taking prompt and corrective action. Pilots must be properly trained and disciplined enough to use a "safety over mission" mindset when it comes to maintaining positive aircraft control at all times. The overall safety and integrity of the mission depends on it.

A go-around should be initiated, without hesitation, anytime the helicopter ventures outside the boundaries of the MIE during maneuvering flight. The extra practice time forfeited from early go-around pales in comparison to the possible consequences of trying to salvage a grossly botched maneuver in close proximity to the surface.

The following consequences have been experienced by pilots who failed to confirm each safety element is not within the MIE prior to initiating a maneuver. Don't let these consequences spoil your day by not allowing adequate setup time and preparation prior to each maneuver.

- Increased workload.
- Sloppy maneuver/exceeding limits .
- Unsatisfactory performance.

- Negative employment screenings.
- Accident/Incident.



Summary

Many loss-of-control accidents occur because airmen initiate or are allowed to continue maneuvers when the flight is outside the MIE. This concept was developed to remind airmen, instructors, and flight examiners that there are many things to consider before beginning a flight maneuver.

Insuring all elements remain in the MIE can greatly increase safety. Professionalism and discipline in the cockpit can yield positively and help pilots maintain positive aircraft control when dynamic and rapidly changing factors are swarming about the MIE. The MIE acts as a tool to help pilots evaluate, plan and ultimately place their "stamp of approval" on the envelope in which they fly!



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More Information

More information about the IHST, its reports, its safety tools, and presentations can be obtained at its web site www.IHST.org.

