HAI Instrument Foundation Syllabus for initial training Recommendation

Introduction

The HAI Training Working Group has found that basic instrument training, the foundations given during PPL and CPL training for the helicopter pilot, is typically not delivered consistently to a common standard across the industry. This is regardless of the original Country of training. It seems to be a common malady across the globe.

Although each ICAO member Country has made a commitment to make allowance for some basic instrument training within the PPL and CPL syllabuses the reality is this is either not done well, often done in a small, fixed wing, not done at all or unachievable due to regulation and the high cost of achieving it in a helicopter. This does not mean that there are some individual operators out there doing it very well. It simply means there is no consistency across the industry.

Additionally, training towards a full Command Instrument rating in a helicopter also appears to not be delivered consistently across ICAO member states with some Countries allowing instrument training and testing done in VFR aircraft with a pilot never actually experiencing an IFR flight nor flight into a cloud or IMC environment while others only allow for it in a full IFR certified multiengine helicopter making it cost prohibitive or the domain only of ex-military aviators. It appears that instrument training for helicopter pilots not going through the military system is often done on the job by an operator with already qualified CPL pilots. If done via a helicopter flight school, then the schools appear to be typically under equipped, not utilizing helicopters with a minimum list of instruments, not tested in an IFR helicopter in IMC conditions and delivered by instructor pilots lacking any real guidance or structure.

The helicopter industry now needs to consider a common and achievable standard and acceptable practices in the fundamentals of helicopter instrument training achieve consistent results and allow a broader base of consistent training and qualification of crews into the industry.

Definition of Basic Instrument Flying Training

''To learn the basics of attitude and performance flying of an aircraft to control pitch, roll, yaw, speed and altitude with sole reference to the flight instruments''

Important Clarification:

Basic instrument flying ***DOES NOT*** provide enough competency for a pilot to enter IMC or attempt any IFR procedures. It does not include any of the aspects of operations under the Instrument Flight Rules (IFR) including planning, approaches, and departures or any IFR procedures.

Basic instrument flying is a pre-requisite to additional training required for an instrument rating and should be taught at the PPL and CPL stages. It can then be recognized reviewed and expanded on when continuing for night and instrument qualifications.

It is the grass roots basic level of understanding how to fly the helicopter while interpreting the attitude instruments with no ability to receive attitude information by looking outside. It offers no

qualification or additional privilege but is simply incorporating the effects of controls, elementary handling and some recovery techniques to a basic pilot qualification.

It is a perishable skill. In other words, it must be repeated and reviewed often to retain a level of competency. Doing it once does not make a pilot proficient going forward in time nor capable to manage IMC.

With reference to IIMC training

Any real IIMC training must begin with a strong foundation of basic instrument skills before additional recovery techniques can be delivered.

If pilots have a better understanding of the difficulties of instrument flying in a helicopter during basic training they are more likely to make more effort in avoiding an IIMC encounter rather than trying to use a skill they are more than likely not proficient in within a helicopter not equipped or certified for IMC.

History

There are many reasons for this inconsistency within industry.

Historically instrument flying has not been the normal progression for a civilian trained helicopter pilot. Nor have small to medium helicopters been designed with instrument flying in mind. Instead, a helicopter is designed for either private use or to conduct some form of work where it is used as a tool in support of a job. Helicopters are not typically used to carry fare paying passengers from terminal to terminal under the IFR as is common in the fixed wing world. The only real sector within the helicopter industry supporting this type of activity is the oil and gas industry with IFR multi engine helicopters acting like an airline in its activities and training with an exemplary safety record in a very demanding environment.

The typical VFR helicopter, by its very nature is not a stable aircraft. It requires constant hands on flying in the visual environment.

With advances in technology and the availability of more sophistication at a cheaper price and in a smaller package, this now allows helicopter pilots to be more exposed to instrument flight, but they are not receiving the same levels of training as their fixed wing counterparts in that specific activity within the category (helicopter). Additionally, instrument instructor training is not being provided consistently leading to a watering down of knowledge skills and attitudes as the under qualified instructor delivers weaker information to their students. Simply being able to make an approach does not make an instrument pilot.

Another factor is the regulator of each country. Historically fixed wing standards and practices are being imposed on the helicopter side of the house. This is not always transferable due to the differing natures of how each aircraft flies and operates. In essence helicopter instrument flying although having very similar demands as a fixed wing also has very real differences that need to be considered.

The last important reason is that it has been driven by the OEMS. Not wanting to spend the money on certifying a single engine helicopter for IFR means that they have not been available. The preference of he OEM is to get purchasers and regulators to believe that it is safer for all operations

to be in a multi engine helicopter when operating under the IFR. However, the cost for a multi-engine helicopter makes instrument training and operations a very narrow market not achievable by the self-funded trainee.

Recommendation

The HAI Training Working Group is recommending a standard foundation instrument syllabus to be considered by flight schools to be incorporated within their PPL and CPL syllabus.

It must be acknowledged that instrument flying in a helicopter, particularly basic hands-on instrument flying, has a higher degree of difficulty due to the aircrafts inherent instability when compared to a similar sized fixed wing. Although the theoretical knowledge required is the same, the actual hands-on learning and flying techniques can differ.

For this reason, then, the HAI recommends the following broad course overview

Course Overview

This course shall be conducted in VMC clear of cloud but with the use of a vision restricting device on the student. When in the simulator, there are to be no outside visuals available (IMC environment)

1. Foundation Instrument flying should be done within the category of aircraft for which a licence is being sought.
a. If learning in a helicopter, then a helicopter simulator and helicopter must be used.
b. If learning in a fixed wing, then a fixed wing simulator and fixed wing must be used.
c. If a pilot is converting from one category to the other (in other words they already hold a PPL or CPL license in the other category) then only training to *competency* in the opposing category is required with no set prescriptive minimums.
d. It can be conducted in any helicopter that has the following minimum set of instruments in the standard **T** format.
    i. Artificial Horizon (AH) or Attitude Indicator (AI)
    ii. Altimeter
    iii. Vertical Speed indicator (VSI)
    iv. Airspeed indicator (ASI)
    v. Turn indicator
    vi. Balance ball
    vii. Heading indicator (HSI, DG or Compass)

2. A PPL shall do 5 hours of basic instrument training in the category with 2.5 hours permitted in a flight simulator training device (FSTD) of the same category
3. A CPL shall do 10 hours of basic instrument training in the category with 5 hours permitted in a flight simulator training device (FSTD) of the same category
4. An ATPL needs no additional instrument training above the CPL unless requiring an instrument rating for the operation whereupon a full command instrument rating will be completed as a standalone. This allows ATPL pilots to command heavy aircraft under the VFR with no intention to operate under the IFR. To gain an ATPL only requires a type rating in an aircraft within the weight category and a Multi-crew cooperation (MCC) course.

Reference Material

There is a multitude of commercially available reference material for instrument training and aeromedical. Which texts are used is up to the flight school.

It is not from a lack of material but a lack of consistent application and delivery of the material that the HAI wishes to address.

Additionally, the HAI decisions and IIMC recovery white paper offers refence material that is available to members and non-members for use.

HAI recommended Syllabus for basic instrument flying (Overview)

Basic Instrument theory

1. Aeromedical theory — 20 hours
    a. Introduction to Aeromedical
    b. The ear
    c. Proprioceptive system
    d. The eyes
    e. Fatigue
    f. Illusions
    g. Spatial Disorientation
2. Basic Instrument theory — 20 hours
    a. Instrument flight
    b. Basic Instrument maneuvers
    c. Navigation aids (as applicable)
    d. Weather requirements
    e. LSALT/MSA calculations
    f. Alternate and Holding requirements
    g. Fuel requirements
    h. IIMC planning and preparation
    i. Use of checklists
3. Basic Instrument flight training PPL — 5 hours
    a. Attitude and performance flying
    b. U/As and IIMC initial actions
    c. IIMC recovery
4. Basic Instrument training CPL — 5 hours
    a. Complete the PPL syllabus then
    b. Revision to competency of above
    c. Orientation and intercepts to Nav Aid
    d. No aid descent and IIMC recovery

HAI recommended Syllabus for basic instrument flying (Detailed)

Basic Instrument theory

5. Aeromedical theory
    a. Introduction to Aeromedical 1 hour
    b. The ear 3 hours
    c. Proprioceptive system 2 hours
    d. The eyes 4 hours
    e. Fatigue 2 hours
    f. Illusions 4 hours
    g. Spatial Disorientation 1 hour
6. Basic Instrument theory
    h. Instrument flight 2 hours
    i. Basic Instrument maneuvers 3 hours
    j. Navigation aids (as applicable) 2 hours
    k. Weather requirements 2 hours
    l. LSALT/MSA calculations 2 hours
    m. Alternate and Holding requirements 2 hours
    n. Fuel requirements 2 hours
    o. IIMC planning and preparation 4 hours
    p. Use of checklists 1 hour
7. Basic Instrument flight training PPL SIM A/C
    q. Attitude and performance flying 1 hour 1 hour
    r. U/As and IIMC initial actions 1 hour 1 hour
    s. IIMC recovery 1 hour
8. Basic Instrument training CPL
    t. Complete the PPL syllabus then
    u. Revision to competency of above 1 hour
    v. Orientation and intercepts to Nav Aid 1 hour 1 hour
    w. No aid descent and IIMC recovery 1 hour 1 hour

Lesson Plans

9. Aeromedical theory
    - x. Introduction to Aeromedical 1 hour
    - y. The ear 3 hours
    - z. Proprioceptive system 2 hours
    - aa. The eyes 4 hours
    - bb. Fatigue 2 hours
    - cc. Illusions 4 hours
    - dd. Spatial Disorientation 1 hour
10. Basic Instrument theory
    - ee. Instrument flight 2 hours
    - ff. Basic Instrument maneuvers 3 hours
    - gg. Navigation aids (as applicable) 2 hours
    - hh. Weather requirements 2 hours
    - ii. LSALT/MSA calculations 2 hours
    - jj. Alternate and Holding requirements 2 hours
    - kk. Fuel requirements 2 hours
    - ll. IIMC planning and preparation 4 hours
    - mm. Use of checklists 1 hour
11. Basic Instrument flight training PPL SIM A/C
    - nn. Attitude and performance flying 1 hour 1 hour
    - oo. U/As and IIMC initial actions 1 hour 1 hour
    - pp. IIMC recovery 1 hour
12. Basic Instrument training CPL
    - qq. Complete the PPL syllabus then
    - rr. Revision to competency of above 1 hour
    - ss. Orientation and intercepts to Nav Aid 1 hour 1 hour
    - tt. No aid descent and IIMC recovery 1 hour 1 hour