A N INTEGRAL PART OF A heli-
port’s function must be the enhance-
ment of safety. In this regard, an old
saying used by designers—“form
follows function”—applies to helicopter infra-
structure as well.

Heliport safety is related directly to the
design and planning of a heliport. The FAA,
Helicopter Association International (HAI) and
the American Helicopter Society (AHS)
worked together to develop the FAA Advisory
Circular (AC) 150/5390-2A, “Heliport
Design,” in 1994. Although it describes the
minimum, not optimum, design standards, it is
an excellent safety guideline. Unfortunately,
many established heliport facilities do not meet
the minimums outlined in the AC.

The AC is not mandatory in the eyes of the
FAA, unless federal funding is involved. Also,
you may prefer a certified GPS instrument
approach. Nonetheless, about half of the states,
many local jurisdictions and the U.S. Courts
have adopted the AC as the undisputed stan-
dard. In all cases, it is highly recommended
that heliports follow this publication, regard-
less of legal requirements, for safety’s sake.

There are easily identified hazards in the
basic design or operations at heliports that
could facilitate an accident under the right set
of circumstances. The most common deficien-
cies fall into six categories: insufficient space;
poor surface; inadequate approach/departure
paths; wind and turbulence effects; lack of
security; and poor training and emergency
planning.

Insufficient space
The FAA guidelines, on which most other
state and local regulations are based, call for
an obstacle-free area, called a Final Approach
and Takeoff Area (FATO) of 1.5 times the
overall length (OL), plus a safety area one-
third the rotor diameter (RD) on each side.

As an example, the area would be just less
than 110 feet for an S-76. If the OL is 53 feet,
then (OL) x 1.5 = 79.5 feet. RD is 44 feet, so
RD divided by three = 14.66 feet. This works
out to be 79.5 feet (OL) + 29.32 feet (14.66
feet on both sides) for a total of 108.82 feet.
This provides sufficient maneuvering room,
free of obstacles that could be struck by the
rotors, tail boom, landing gear, and so on.

The most common obstacles found in this
area are perimeter lights, fences, floodlights,
fire protection and fueling equipment, wind-
socks, and light poles. All of these objects
have been struck by helicopters at one time or
another.

Poor surface
A number of dynamic rollover accidents
occur due to soft asphalt that can catch a skid
or wheel. Irregular heliport touchdown sur-
faces also have been blamed for such acci-
dents. In order of preference, the best materials
are: concrete, concrete pavers, metal surfaces,
and stabilized turf.

The key to a safe touchdown area is a rela-
tively smooth and flat area without any irregu-
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**Inadequate approach/departure paths**

The FAA’s recommended approach and departure paths are the imaginary ramps into the air that start at the edge of the FATO and proceed upward at an 8:1 slope, expanding evenly in width until they are 500 feet wide at 4,000 feet from the heliport. The 8:1 slope translates to a 12.5-foot height increase for every 100 feet from the FATO.

A hover-hole (a heliport with steep approaches and departures) leaves very little room for options in an emergency. The preferred design is to create two 8:1 approach and departure paths as far apart as possible and relative to the expected winds.

**Wind and turbulence effects**

A very important element in heliport design and operations is the anticipation of wind and mechanical turbulence effects. All heliports without proper allowance for airflow design—especially rooftops, helipads that are downwind or in the vicinity of other buildings—can give the unwary pilot an unwanted surprise. Wind shear, rotor tip vortices, even 180° shifts in the wind direction are possible. Many hard landings, overtemps and overtorques have been attributed to these factors.

**Lack of security**

Provisions for securing the heliport must be in place to protect both the public and the helicopter, especially if the helicopter will be left unattended. Properly designed and located pedestrian barriers, such as bushes, flower beds, ground cover and areas that deter passage (such as large rocks, non-obstructing fences, and even a moat) can be very effective. If available, properly trained security personnel can be more valuable than most barriers.

**Poor training and emergency planning**

Improper passenger handling, coupled with poor security, results in many serious and fatal injuries. Proper training for people who work in the vicinity of an operating helicopter is essential. Posting warning signs and emergency numbers at the heliport can improve safety. Ensuring that the heliport has the proper access to fire protection, drainage, equipment and training is also very important.

Liability is an important issue for non-criteria heliports. If a person is injured or killed at a heliport and there is a direct relationship between the accident and a non-criteria design or operational issue, the heliport, the pilot and the helicopter operator may be found liable for any resulting legal damages.

This is not to say a compliant heliport is a guarantee of security against liability exposure, but compliance eliminates a substantial contributing factor in many heliport accidents.

**Proper planning**

By designing a helipad according to safe criteria, most accidents can be avoided. Copies of the AC can be obtained directly at www.faa.gov/arp/pdf/5390-2a.pdf or by contacting the airports office at FAA regional headquarters.

Another resource available to aviation professionals for understanding heliport requirements is the Heliport/Vertiport Development Guide published by HAI. It contains a copy of the FAA Heliport AC and a wealth of other information that explains the process of basic heliport design. The guide also contains an excellent training and operations manual for heliports that covers all appropriate areas of knowledge.

**When regulations get in the way**

What if well-meaning safety regulations hurt more than help?

The FAA is updating the Heliport Design AC to increase the required safety areas that are already in place. The majority of the helicopter industry is increasingly concerned while it works hard to convince the FAA that no revision is necessary. Good intentions can go too far and cause more harm than good.

In the eight years that this AC has been in service, not one accident at a heliport that meets the standards in this publication resulted from the design. In other words, nothing noted in the AC contributed to the accident. Of course, accidents happened, but none were caused by a design element that met those required by the AC.

So why change the AC? The FAA has been working on revising this publication in the name of increasing safety since 1984. The well-intentioned reason was to decrease accidents at and near heliports. However, by the FAA’s own admission, there was not enough data even to make this determination.

The FAA first published a report to justify updating the AC. In the report, DOT/FAA/RD-90/8 “Analysis of Helicopter Mishaps at Heliports, Airports, and Unimproved Sites,” the FAA stated the need to select and evaluate 100 heliport mishaps. There were nowhere near 100 accidents to study, so off-heliport and airport mishaps were included. Unfortunately, the data is not relevant to mishaps at conforming heliports because of this inclusion and because no design data for involved heliports was available.

Another report, NASA/TLR-2000-209597, USAAMCOT-TR-00-A-006 “U.S. Civil Rotorcraft Accidents, 1963 through 1997,” further illustrates that no accidents were caused by faulty design at heliports that met the AC design criteria.

Because there already was a very low instance of heliport accidents and none was the result of current AC criteria, the FAA’s accident-reduction efforts should have ended there.

In 1987, the industry heliport working group agreed to increase sizes at transport and public-use facilities to appease the FAA. The changes to the public-use criteria were not major at that time. The FAA has since continued on this “bigger is better” tract on subsequent revisions, irrespective of a lack of support from the operational helicopter industry.

Regardless, the FAA is pushing forward to increase the size of the Touchdown and Liftoff Area (TLOF), increase sizes for multiple helicopter rooftop heliports, transitional surfaces, slopes around the helipad and extremely large and complex taxiways.

These and other changes not only will make redevelopment of current heliports cost prohibitive, but also will inhibit the future development of heliports due to the lack of available space and funds. By increasing the clear area required for a heliport as well as the size of load-bearing surfaces, the FAA will make many heliports too expensive to develop.

Many currently established heliports will be unable to afford reinforcing existing surfaces and, in some cases, complete reconstruction. Most safe heliports do not have the room to meet the proposed guidelines. They will be forced to close. Thus, a well-meaning initiative will in fact prohibit heliport operations in states and local jurisdictions where compliance with the AC is mandatory.

The FAA has consistently ignored industry requests for a cost-benefit analysis. The FAA’s answer to that has always been, “That effort is not required for an Advisory Circular, only for regulations.” This flies in the face of the AC being the undisputed design standard.

Publishing a new AC would yield no definable and defendable increase in safety, but would undeniably increase costs and impose severe limitations on available sites. The helicopter industry and the public, not the FAA, are the losers that will need to pay.

NOTE: Since the time this article was written, the helicopter industry, worked with the FAA. The current subject AC does not have 90% of the protested changes within the document.