

CHAPTER 102. EVALUATE A FEDERAL AVIATION REGULATIONS (FAR) PART 133 CONGESTED AREA PLAN (CAP)

SECTION 1. BACKGROUND

1. PROGRAM TRACKING AND REPORTING SUBSYSTEM (PTRS) ACTIVITY CODE: 1332

3. OBJECTIVE. The objective of this task is to determine if a CAP meets all regulatory and safety requirements. Successful completion of this task results in either approval or disapproval of a CAP.

5. GENERAL.

A. Authority. FAR 133.33(d)(1)(2) permits an operator to conduct external-load operations over congested areas provided the operator does so without creating undue hazard to persons or property. Each flight must be conducted on a route and at an altitude that will allow a jettisonable load to be released and the helicopter to be landed safely if an emergency arises. FAR 133.33(d)(1) requires the operator to develop a plan for each operation in a congested area. The plan must be approved by the Flight Standards District Office (FSDO) having jurisdiction over the area in which the operation will be conducted.

B. Background. The Federal Aviation Administration (FAA) has determined that external-load operations are in the public interest and do not inherently pose an undue risk to the public. Hazards are prevented by risk management procedures such as a CAP, and by frequent surveillance. FAR 133.33(d)(1) describes the information that must be included in a CAP.

C. Definitions.

(1) Without Hazard. This means to operate without undue hazard beyond the risk posed by other aircraft operations to nonparticipating public or property. The nonparticipating public is expected to be protected from all the potential hazards associated with external-load operations. Property should be protected as much as possible. Potential hazard to property alone should not preclude conducting an external-load operation in accordance with a CAP.

(2) Congested Areas vs. Densely Populated Areas. These two terms are used in reference to rotorcraft external-load operations. Although the terms

describe similar areas, the meanings are different. The regulations require preparation of a CAP for congested areas. A CAP is also needed for densely populated areas. In addition, an uncongested, sparsely populated area may need a CAP because the area may quickly become congested with persons watching an external-load operation.

(a) Congested Area: The congested nature of an area is defined by what exists on the surface, not the size of the area. While the presence of the nonparticipating public is the most important determination of congested, the area may also be congested with structures or objects. An area considered congested for airplane operations could be equally congested for helicopters. If an airplane flying over a congested area at less than 1,000 feet above ground level (AGL) is in violation of FAR 91.119(b), the area may also be a congested area for a helicopter conducting external-load operations. However, the most important word in this concept is over. Helicopters can operate over relatively small uncongested areas because of their maneuvering abilities.

(b) Densely Populated Area : FAR 91.313 and 133.45(d) use the term “densely populated” area. Those areas of a city, town, or settlement that contain a large number of occupied homes, factories, stores, schools, and other structures are considered densely populated. Additionally, a densely populated area may not contain any buildings but could consist of a large gathering of persons on a beach, at an airshow, at a ballgame, or at a fairground.

(c) Congested and Densely Populated: A fully developed residential area and a fully developed business area of a city should be considered congested and densely populated unless it can be proven that the areas are unoccupied by the nonparticipating public.

(d) Uncongested, Sparsely Populated: A CAP may be required for an uncongested, sparsely populated area, that is an isolated space within or along the periphery of a residential section of the city that is not congested when unoccupied by persons. Exam-

ples of this situation include a large park, an abandoned airport, an abandoned shopping center with large parking lots on all sides, or a large construction site. Even though these areas may not be congested or densely populated, a plan may be necessary to prevent the areas from becoming congested with spectators when the operation begins.

(3) *CAP*. The CAP is a risk management document. It is used to show the risk associated with an external-load operation will not create undue hazards to property and the nonparticipating public because of certain, specific procedures used by the operator during the operation.

(4) *Restricted Category Aircraft*. FAR Part 133 provides that a rotorcraft external-load operator may conduct operations over congested areas only in a rotorcraft type certificated under and meeting the requirements of FAR Parts 27 and 29 (normal and transport category rotorcraft). Restricted category rotorcraft certificated in accordance with FAR Part 21 do not necessarily meet airworthiness requirements for FAR Parts 27 and 29. Therefore, in order to maintain an equivalent level of safety, restricted category rotorcraft shall not be used in congested airways, over densely populated areas, or near a busy airport where passenger transport operations are conducted. Restricted category rotorcraft operators may be required to submit a CAP in accordance with paragraph 5C(2)(d) of this Section.

(5) *Contractor*. The person, corporation, or entity who hired an operator to conduct the external-load operation.

(6) *Operational Area*. An area unoccupied on the surface by the nonparticipating public. The operational area is not part of the operation, but persons within this area could be injured, or property could be damaged by the external-load, or by the attaching means (load, cables, hooks, etc.).

(7) *Appropriate Political Subdivision*. This term describes local officials who may exercise the authority to exclude persons and property from an area. These officials include the county sheriff, city police department, highway patrol, fire department, or security guards acting for the political subdivision. In many cases local police will monitor an external-load operation but will require the operator to supply sufficient personnel to exclude persons and property from the lift area.

(8) *Emergency landing site*. FAR 133.33(d)(2) requires the rotorcraft to be at an altitude that allows landing in an emergency without hazard to persons or property on the surface. There is no requirement that the emergency landing be made without damage

to the rotorcraft. An emergency landing site does not have to be an improved surface. The parking lot at the pickup site or a roof top at the set site are examples of emergency landing sites.

(9) *Near a Busy Airport Where Passenger Transport Operations are Conducted*. An external-load operation conducted within Class D airspace could be considered near a busy airport under FAR 133.45(d). External-load operations with restricted category rotorcraft may not be conducted within such an area when passenger transport operations (air carrier and air taxi) are being conducted. The operator should be advised that advance coordination with the Air Traffic Control (ATC) facility is necessary to ensure the establishment of the proposed hours of external-load operation. The external-load operators using restricted category rotorcraft must show that adequate procedures exist to ensure that no external-load operation is conducted when passenger transport operations are in progress. Passenger transport operations are considered in progress whenever an aircraft engaged in these operations is in flight within the above defined areas and the operator is so advised by ATC.

NOTE: As of September 16, 1993, the phrases airport traffic area and control zone with tower became known as Class D airspace.

D. Evaluation of the CAP. For each operation, the certificate holder is required to submit a plan that must be approved by the jurisdictional FSDO. A separate plan is not necessary for each flight. One plan may suffice for an operation that requires several flights or even days to complete. Plans vary widely, and it is up to the inspector to consider all situations that may arise.

E. Qualifications of Inspector Evaluating the Plan. Whenever possible, CAP's should be reviewed by an inspector with experience as an external-load helicopter pilot. If a FSDO does not have an inspector with this experience, the best qualified operations inspector will be designated by the office manager.

F. The Concept of Risk Management in External-Load Operations. It is unreasonable to expect the plan or the inspector to foresee every unlikely eventuality, including crash forces or scatter patterns. A helicopter crash that occurs during a low speed, low altitude external-load operation may produce less crash force than another helicopter without an external-load that crashes with 120 knots forward speed. However, to exclude the operation of any of these category of aircraft would not be in the public interest. The operator is responsible for developing a plan that minimizes manageable risk to ensure that the operation is not a hazard to property and the nonparticipating public.

G. A Complete and Acceptable Plan. The operator must provide enough information to ensure that there is no undue hazard to property and the non-participating public. A comprehensive list of requirements is found in Section 2 of this Chapter. The following provides background for the requirement of certain information.

(1) Identification of rotorcraft is used to verify that a particular helicopter is on the List of Authorized Rotorcraft.

(2) Identification of rotorcraft airworthiness category is used to determine whether the operator plans to use restricted category helicopters. Additional considerations are required, and are outlined below.

(a) The inspector should determine if the area of the proposed operation is a congested area.

(b) Even in uncongested areas, the inspector may require the operator of restricted category helicopters to submit a plan to ensure that the area does not become congested during the operation.

(c) If the surrounding area is densely populated, the operator might elect to transport the restricted helicopter to and from the site on a truck or trailer.

(3) It is necessary to include the dates and times of the proposed operation so the inspector can evaluate the exclusion of unauthorized persons from the area by the local authorities, or the operator when delegated to do so by the local authorities. It also provides the inspector with the opportunity to conduct surveillance during the operation.

(4) The name, phone number, and title of the official of the local political subdivision should be provided.

(5) When evaluating the plan, the inspector should consider the weight, shape, and aerodynamic flight characteristics of the load.

(6) The inspector needs to know the estimated length of cable to determine if the plan provides for an adequate operational area.

(7) The operator should estimate how many floors could be penetrated by the load with attaching means if dropped from the highest point that it will be lifted above the building. The type of roof construction and the size, shape and weight of the load must be taken into account. The operator must state the highest point above the building (for example, 10 feet) the load will be lifted to. The plan should require that one additional floor beyond those estimated to be penetrable be unoccupied.

(8) The inspector can contact building owners to verify that the building will actually be unoccupied during the operation. Exclusion of persons includes after-hours personnel such as building maintenance workers.

(9) Aeronautical charts alone often do not provide sufficient detail for depicting routes and altitudes over a congested area. City maps or even hand drawn charts may be necessary. Hand drawn charts should be drawn to approximate scale. Topographical maps and charts and aerial photographs should be as recent as possible to assure an accurate representation of the area.

(10) Photographs of the lift site, set site and surrounding areas can also be an asset to the inspector. If the CAP is in an area unfamiliar to the inspector, the addition of these photographs can greatly reduce the amount of time needed to approve the CAP.

(11) Each external-load operation is unique; the operational requirements and the risk to the non-participating public dictate operational area requirements. The following are expressed in ratios. It must be emphasized that these are guidelines, and the inspector may exceed or reduce them as appropriate.

H. Criteria 1, Normal Loads. For nonaerodynamic loads, such as air conditioning units and flag poles flown below effective translational lift (ETL), the radius of the operational area should be at least 1.5 times the overall length (including rotor discs) of the helicopter used, or the length of the external-load including the attaching means (cable, etc.), whichever is greater. (Figure 102-1) When operating along a route above ETL, the operational area should extend at least 45 degrees in front of the rotorcraft. For example, if the rotorcraft (not load) will be operated at 300 feet above the surface, the operational area should extend at least 300 feet in front of the rotorcraft. The forward radius should not extend less than three times the overall length of the helicopter (Figure 102-2).

I. Criteria 2, Aerodynamically Shaped Loads. For aerodynamic loads, use whichever is greater: Criteria 1 (paragraph 5H, of this section) or Criteria 2. In Criteria 2, the criteria applied to aerodynamic loads provides for about 45 degrees of drift after the load is released. If the load is lifted 200 feet high, the operational area radius should be 200 feet. The method of calculation that provides for the greatest operational area should be used. For example, a helicopter will transport an aerodynamically shaped load along a congested area route. The higher the load is lifted above the surface, the wider the operational area must be to accommodate drift of the load if it is released. Conversely, operating the rotorcraft at a higher altitude provides more options for landing in

an emergency. Generally, the plan should provide for operating the rotorcraft at an altitude high enough to permit landing in an emergency, but hold the load low enough to ensure that the external-load will land within the operational area if it is released. This operation should not be conducted in strong crosswinds. (Figure 102-3)

(1) The operator's plan must provide an estimate showing the maximum number of floors that would be penetrated if the load was released from the highest point the load will be lifted above the roof considering the type of building construction employed. The plan should provide that the number of floors specified plus one additional floor below the delivery site be unoccupied. On a large building the unoccupied area should equal the size of the emergency landing area if the building is to be used as an emergency landing site. On a tiered building, the height the load will be lifted above each tier will determine the number of floors in the respective tiers that must be unoccupied (Figure 102-4). For occupied buildings, the plan must show that the helicopter will be operated at an altitude and in a position that will allow landing on the specified emergency site. Buildings adjacent to the site that fall partially within the radius of the operational area must also be unoccupied by persons as appropriate.

(2) The operational area shall provide for a landing site for use in case of an emergency. As a guide, the length of the designated emergency landing site should be at least two times the overall length of the helicopter; the width of the landing site should be at least one and one-half times the overall length of the helicopter. In the event a plan calls for an occupied building to be the emergency landing site, special considerations must be taken into account, such as fuel spills down drain pipes or elevator shafts. An evaluation by the fire department may be necessary in order to determine if an emergency evacuation could be conducted without undue hazard to the occupants. It would be prudent, but not always possible, for the plan to specify that fire department personnel and equipment will stand by at the scene during this kind of operation (Figure 102-5).

J. Conditions of Approval. The inspector may find it necessary to specify conditions of approval for a plan. These contingencies may be based on the inspec-

tor's experience monitoring similar plans or experience with this operator. The inspector may approve the plan in principle provided the operator complies with the written contingencies the inspector notes on the plan.

K. Coordination with Appropriate Officials. Local officials should exclude unauthorized persons from the site if open to the public. In some cases, local officials may delegate this task to the operator, who is ultimately responsible for site security.

L. Subcontracting Work or Equipment: Responsibility for the CAP. A situation may arise when an external-load operator contracts with another external-load operator for a specific operation. For example, operator A's helicopter can lift only a certain weight that is less than the weight of the load to be lifted. Operator B has a large helicopter that can lift the load. In this case, operator B would have to submit the CAP because operator B is actually performing the work. If operator A wishes to conduct the external-load operation using operator B's helicopter, operator A must meet all certification requirements appropriate to adding operator B's helicopter to operator A's list of authorized rotorcraft.

M. Site Inspection. Unless the inspector has a current working knowledge of the site/route, or the operator can supply photographs of sufficient detail, an on-site survey should be made.

N. CAP Contingencies. The CAP submitted by the operator should contain contingency plans for as many variables as possible. With approved contingencies, the operator will not have to postpone the operation to seek FAA approval if the plan must be modified.

7. MONITORING A CAP. Ideally, each congested area plan operation should be monitored if practicable. However, an ongoing daily operation may not require continuous monitoring. An operator unfamiliar to the FSDO or an operator working over a congested area for the first time should require an inspector's presence for the duration of the operation. The inspector may initiate emergency revocation of an operation when it is determined that an operator continues to operate contrary to the plan (see Volume 2, Chapter 103 of this handbook).

SECTION 2. PROCEDURES

1. PREREQUISITES AND COORDINATION REQUIREMENTS.

A. Prerequisites. This task requires knowledge of the regulatory requirements of FAR Part 133 and FAA policies and qualification as an Aviation Safety Inspector (ASI) Operations with experience as an external-load helicopter pilot.

B. Coordination. This task requires coordination with the local officials and possibly with the operator's Certificate Holding District Office (CHDO).

3. REFERENCES, FORMS AND JOB AIDS.

A. References.

- FAR Parts 1, 27, 29, 61, 91, and 133
- Advisory Circular 133-1, Rotorcraft External-Load Operations in Accordance with FAR Part 133
- PTRS Procedures Manual (PPM)

B. Forms.

- None

C. Job Aids.

- Sample CAP
- Tape Recorder and Camera Equipment
- Sample letters and figures

5. PROCEDURES.

A. Initial Inquiry. Upon inquiry, give applicant a sample CAP or explain what the plan must include. Indicate that a portion of the Rotorcraft-Load Combination Flight Manual (RLCFM) is reserved for CAP's.

B. PTRS. Open PTRS file.

C. Review Submitted Plan. An acceptable plan must include (but not be limited to) the following information.

(1) The name, address, and phone number of operator.

(2) The name, address, and phone number of contractor.

(3) The identification number of rotorcraft (N-number).

(4) The type of aircraft (make and model) to be used and the rotorcraft airworthiness category (standard or restricted).

(5) The name of pilots involved in the congested area operation.

(6) The number of loads to be carried.

(7) A description of loads to be carried including the weight of each the loads.

(8) The date the operation begins, the dates of all flights, and the date the operation ends.

(9) The name and phone number of the person contacted at the Police, Sheriff, Fire Department.

(10) The signature of person responsible for the company (usually the chief pilot).

(11) The date of submission.

(12) A copy of the written agreement with local officials for the exclusion of unauthorized persons, or the name and telephone number of the official if responsibility is delegated to the operator.

(13) A record of coordination with ATC (if applicable).

(14) A detailed chart depicting flight routes and altitudes.

(15) A diagram and narrative defining operational areas, pickup sites, delivery site, streets to be blocked and to be unoccupied by persons, and location of obstructions in the operating area.

(16) A procedure for ceasing operation if a potential or real hazard occurs.

(17) A list of all buildings to be unoccupied by persons during the lift.

(18) A list of buildings within the operational area that will be occupied by persons, as well as number of floors which shall be occupied.

(19) An estimate how many floors of the building would be penetrated if the load is released at the maxi-

mum height it will be lifted above the roof, if appropriate. The plan should provide the inspector with assurance that the load will penetrate no more than the number of floors specified in the plan.

(20) An estimate of how long the external-load attaching means will be, such as the length of the cable.

(21) The designation of emergency landing areas at the delivery and pick up sites.

D. Verify Plan. Ensure that the operator has checked with the local political subdivisions to verify they agreed to provide security for the area and that they thoroughly understand the nature and implications of the plan.

E. Review Files. Review office files, or coordinate with the CHDO in order to review the current operating certificate to determine the class of authorization.

F. Site Inspection.

(1) Verify that the operational areas, including emergency landing sites, are adequate as described in the plan.

(2) ravel the actual route to verify that the load may be jettisoned and that the rotorcraft may be landed in an emergency.

(3) Note any discrepancies or conditions of approval.

G. Plan Satisfactory. When all requirements for the plan are met, approve it by stamping, dating, and signing each page. Make a copy of the plan for the FSDO files.

H. Plan Satisfactory with the Addition of Provisions. When all requirements have been met, but the further requirements must be made in the interest of safety, approve the plan with provisions specified in writing (Figure 102-6). Make a copy of the plan and the provisions for the file.

I. Plan Unsatisfactory. Advise the operator that the plan is unsatisfactory and explain what the deficient areas are.

(1) Discuss whether to return the plan or whether the operator will amend the plan.

(2) Review resubmitted plan and reinspect the site as necessary.

J. PTRS. Close PTRS file.

7. TASK OUTCOMES. Completion of this task results in either:

A. A record in the file indicating an approved CAP, with or without contingencies.

B. A letter to the operator outlining areas of deficiency in a CAP.

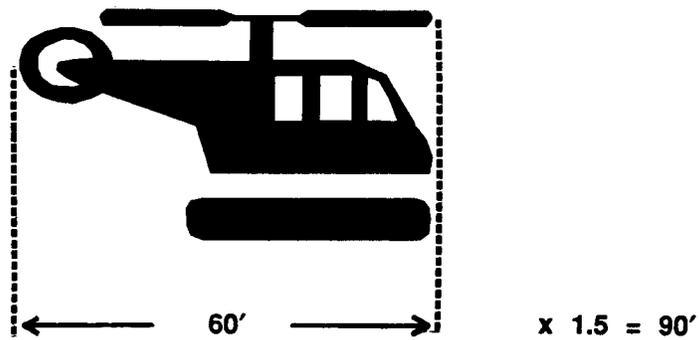
9. FUTURE ACTIVITIES. Monitor the congested area operation to ensure compliance with the approved plan.

**FIGURE 102-1
NONAERODYNAMIC LOAD OPERATIONAL AREA**

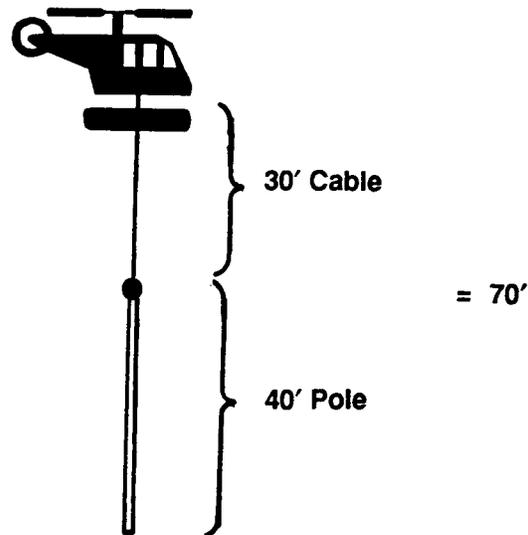
FORWARD DISTANCE BELOW ETL

RADIUS

Use the greater of: a) 1.5 x Overall length of helicopter



b) Overall length of load (including cable)

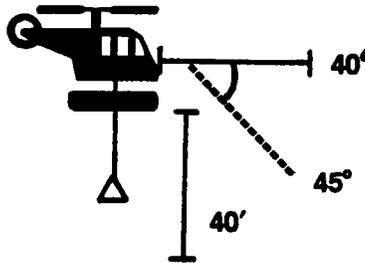


**FIGURE 102-2
NONAERODYNAMIC LOAD OPERATIONAL AREA**

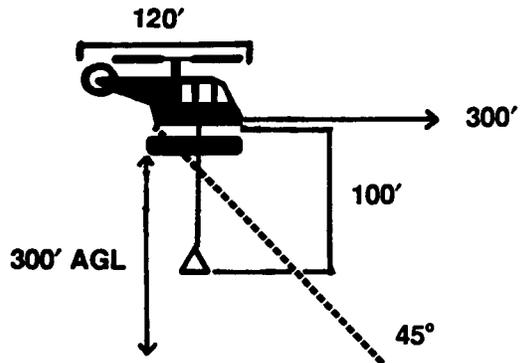
FORWARD DISTANCE ABOVE ETL

Minimum of: (But not less than 3 times overall length)

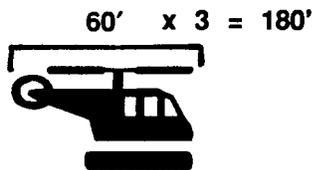
a) 45°, If helicopter altitude less than 50' AGL



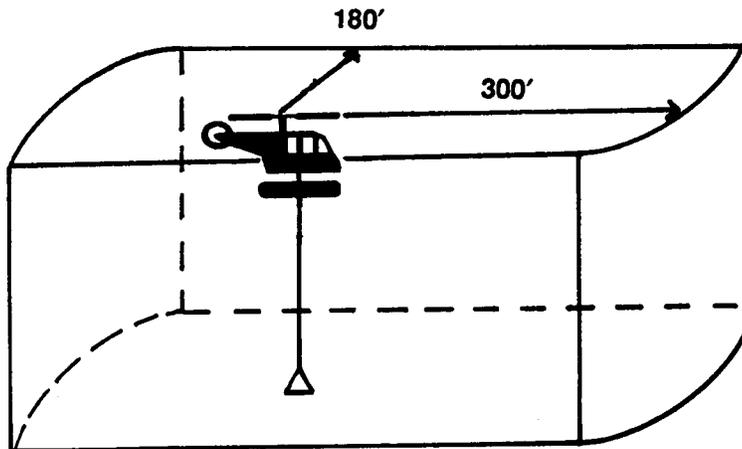
b) Equal to rotorcraft altitude above 50' AGL



c) 3 x Overall length of helicopter



Operational Area for the above example would equal 300' forward distance and would be depicted as:



**FIGURE 102-3
AERODYNAMIC LOAD OPERATIONAL AREA**

RADIUS AND FORWARD DISTANCE COMPUTATION ABOVE ELT

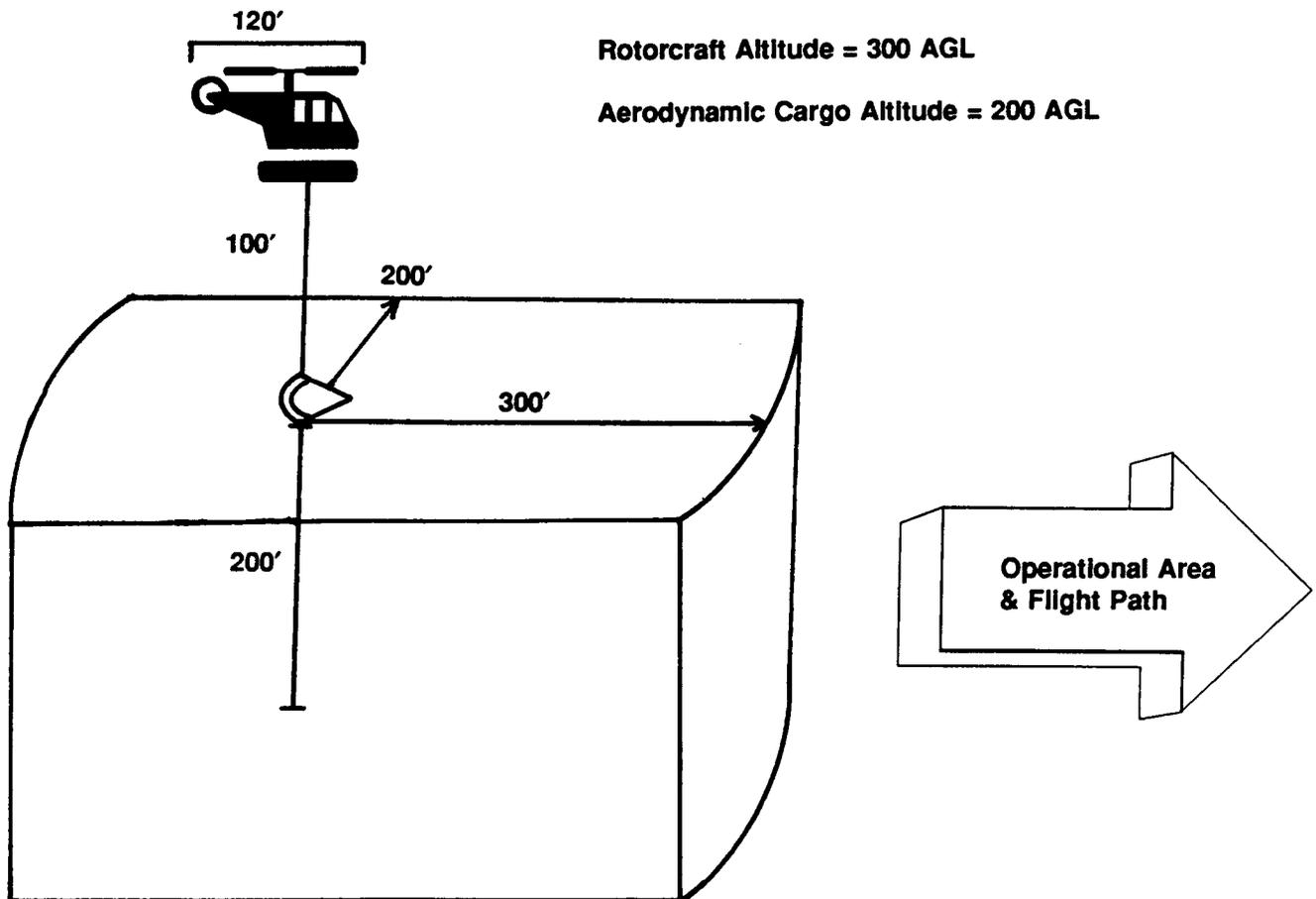
Use the greater of:

1. Non-aerodynamic load criteria

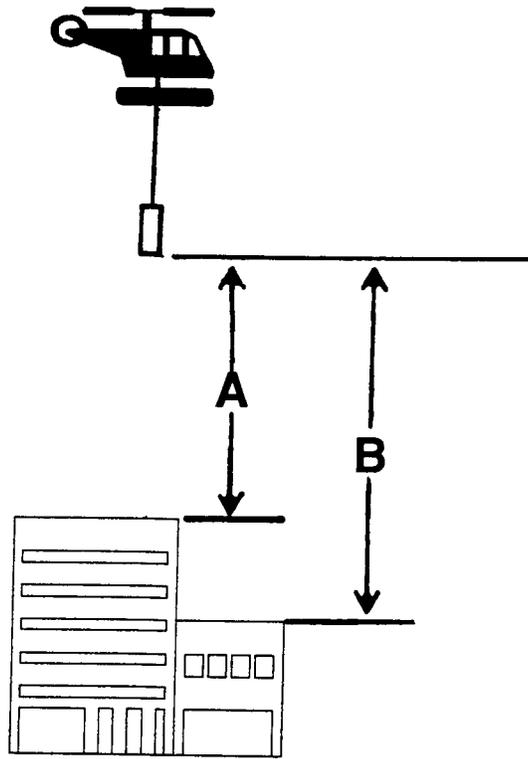
OR

2. Altitude (AGL) of aerodynamic external load.

Using the same criteria from the non-aerodynamic load example in Figure 102-1 and adding the following aerodynamic load, the operational area would be depicted as:



**FIGURE 102-4
HEIGHT OF LOAD ABOVE BUILDING**



A = The maximum height that the load will be lifted above the top of the building must be specified in the plan if the building will be occupied during the operation.

B = The maximum height that the load will be lifted above the lower tier (if applicable) must also be specified if this portion of the building will be occupied during the operation.

FIGURE 102-5
OPERATIONAL AREA AROUND BUILDING AND EMERGENCY LANDING SITE

R = 1.5 x Overall length (OL) of helicopter, including rotor blades
PU = pickup site
DS = delivery site

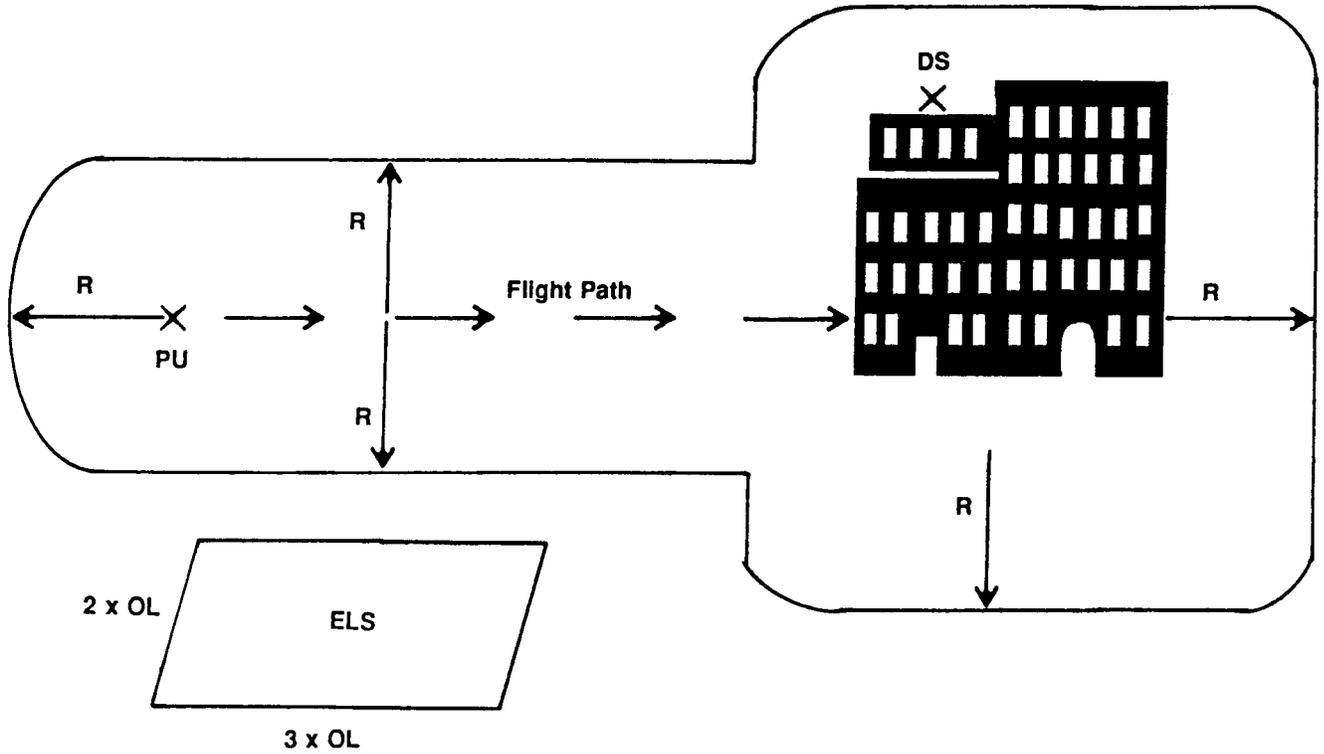


FIGURE 102-6
LETTER APPROVING CAP WITH CONTINGENCIES

FAA Letterhead

[*date*]

[*name and address of the operator*]

Dear [*name of the operator*]:

The approval of the Congested Area Plan submitted by you on [*date*] is confirmed.

This approval concerns the proposed operation at [*site location*] on [*date(s)*], and is contingent on [*cite contingencies as appropriate*]. Inspectors from this office will monitor the operation to ensure compliance with the approved plan.

Should you have any questions or need to submit a change to this plan, please contact this office at [*FSDO telephone number*].

Sincerely,

[*POI's signature*]