includes brokers. The rule would have a carryover cost effect because each subsequent replacement would require coated wire or some other acceptable material, such as galvanized expanded metal. However, the increased cost of coated wire would be made up, at least partially, over time because coated wire will provide longer use.

This rule contains no reporting or recordkeeping requirements.

Executive Order 12372

This program/activity is listed in the Catalog of Federal Domestic Assistance under No. 10.025 and is subject to Executive Order 12372, which requires intergovernmental consultation with State and local officials. (See 7 CFR part 3015, subpart V.)

Executive Order 12988

This final rule has been reviewed under Executive Order 12988, Civil Justice Reform. It is not intended to have retroactive effect. This rule would not preempt any State or local laws, regulations, or policies, unless they present an irreconcilable conflict with this rule. The Act does not provide administrative procedures which must be exhausted prior to a judicial challenge to the provisions of this rule.

Paperwork Reduction Act

This rule contains no information collection or recordkeeping requirements under the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 *et seq.*).

List of Subjects in 9 CFR Part 3

Animal welfare, Marine mammals, Pets, Reporting and recordkeeping requirements, Research, Transportation.

Accordingly, 9 CFR part 3 is amended as follows:

PART 3—STANDARDS

1. The authority citation for part 3 continues to read as follows:

Authority: 7 U.S.C. 2131–2159; 7 CFR 2.22, 2.80, and 371.2(d).

2. Section 3.6 is amended as follows:

a. In paragraph (a)(2)(x), the words ''constructed of wire'' are removed, and the words ''of mesh or slatted construction'' are added in their place, and the word ''and'' at the end of the paragraph is removed.

b. In paragraph (a)(2)(xi), the period at the end of the paragraph is removed, and ''; and'' is added in its place.

c. A new paragraph (a)(2)(xii) is added to read as follows:

§ 3.6 Primary enclosures.

* * * * *

(a) * * *

(2) * * *

(xii) Primary enclosures constructed on or after February 20, 1998 and floors replaced on or after that date, must comply with the requirements in this paragraph (a)(2). On or after January 21, 2000, all primary enclosures must be in compliance with the requirements in this paragraph (a)(2). If the suspended floor of a primary enclosure is constructed of metal strands, the strands must either be greater than ⅛ of an inch in diameter (9 gauge) or coated with a material such as plastic or fiberglass. The suspended floor of any primary enclosure must be strong enough so that the floor does not sag or bend between the structural supports.

* * * * *

§ 3.11 [Amended]

3. In § 3.11(a), the word ''wire'' is removed from the last sentence, and the word ''mesh'' is added in its place.

§ 3.14 [Amended]

4. In § 3.14(a)(9), the word ''wire'' is removed each time it appears.

Done in Washington, DC, this 13th day of January 1998.

Craig A. Reed,

Acting Administrator, Animal and Plant Health Inspection Service.

[FR Doc. 98–1311 Filed 1–20–98; 8:45 am]

BILLING CODE 3410–34–P

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

[Docket No. NM–139, Special Conditions No. 25–ANM–135]

Special Conditions: Ilyushin Aviation Complex Model Il–96T Airplane

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special conditions.

SUMMARY: These special conditions are issued for the Ilyushin Aviation Complex Model Il–96T airplane. This airplane will have novel and unusual design features when compared to the state of technology envisioned in the airworthiness standards of part 25 of the Federal Aviation Regulations (FAR). These special conditions contain the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to that provided by the airworthiness standards of part 25.

EFFECTIVE DATE: February 20, 1998.

FOR FURTHER INFORMATION CONTACT: Norm Martenson, FAA, International Office, ANM–116, Transport Airplane Directorate, Aircraft Certification Service, 1601 Lind Avenue SW., Renton, WA 98055–4056; telephone (425) 227–2196.

SUPPLEMENTARY INFORMATION:

Background

Ilyushin Aviation Complex, 45 Leningradsky Prospect, Moscow, 125190, Russia, has applied for Russian type certification of their Model Il–96T airplane by the Aviation Register (AR) of the Interstate Aviation Committee in accordance with existing AR standards. The AR is authorized to perform airworthiness certification functions on behalf of the Commonwealth of Independent States, including the Russian government. In addition, Ilyushin applied for U.S. type certification of the Model Il–96T on February 16, 1993.

Section 21.29 of 14 CFR part 21 of the Federal Aviation Regulations (FAR) prescribes a reciprocal bilateral agreement between the U.S. and exporting country as a requirement for consideration of U.S. design or airworthiness approval of an imported aeronautical product. Such agreements are known as bilateral aviation safety agreements (BASA). Although the U.S. does not presently have a BASA with Russia providing reciprocal acceptance of transport category airplanes, the FAA is working with the AR and Russian government officials to conclude an agreement of this nature. FAA Advisory Circular (AC) 21–23, Airworthiness Certification of Civil Aircraft, Engines, Propellers, and Related Products Imported to the United States, provides further guidance in this regard.

A BASA with Russia may be concluded following successful completion of an assessment by the FAA and the AR of each other's technical competence and regulatory capability for performing airworthiness certification functions. The scope of the agreement is defined by each authority in Implementation Procedures. FAA type certification of the Model Il–96T transport airplane is therefore conditional upon successful implementation of a BASA with Russia, providing acceptance of transport category airplanes.

One of the key elements of any BASA assessment program is the shadow certification program. Under the Russian shadow certification program, FAA specialists are ''shadowing'' their AR counterpart specialists during AR certification of an example of the aeronautical product that the BASA is intended to cover. This program is intended to provide FAA assessment specialists with ample opportunity to evaluate the AR certification process and the AR specialists' technical competencies to support the airworthiness authority responsibilities inherent in a bilateral agreement. The Ilyushin Model Il–96T was selected as the product for this shadow certification which, if successful, would lead to a U.S.-Russian BASA. Conclusion of the BASA and related implementation procedures would, in turn, be followed by issuance of a U.S. type certificate for that model.

Under the anticipated provisions of the future BASA, the AR has elected to certify that the Model Il–96T complies with the AP–25 type certification standards, plus any additional requirements identified by the FAA to ensure an equivalent level of safety to that provided by the U.S. type certification standards. The AP–25 airworthiness standards, which were developed as the successor to the NLGS–3 standards of the former Soviet Union, were approved by the AR in November 1993 and implemented in Russia in July 1994. These standards have also been accepted by many of the other Commonwealth of Independent States for type certification of transport category airplanes. They were established after extensive harmonization with part 25 of the FAR and the European Joint Airworthiness Requirements (JAR)–25. The AP–25 standards are similar to part 25 of the FAR; however, there are certain specified differences in the requirements of the two documents.

Based on the application date of February 16, 1993, the U.S. type certification standards are part 25 of the FAR, as amended by Amendments 25–1 through 25–77, and these special conditions. In addition, the type certification basis includes the sections of part 25, as amended by Amendment 25–80, pertaining to lightning protection. Compliance with those sections is required under the provisions of § 21.17(a)(1)(ii).

Because the AR has elected to certify that the Model Il–96T complies with the Russian type certification standards, the FAA will make a comparison of the Russian type certification basis and the U.S. type certification standards described above. Based on this comparison, the FAA will prescribe any additional requirements that are necessary to ensure that the Model Il–96T meets a level of safety equivalent to that provided by the U.S. type certification standards. For U.S. certification of the Model Il–96T, the FAA will therefore accept the Russian type certification basis, plus any additional requirements, and these special conditions. As the program progresses, other features of the Model Il–96T may be determined to be novel or unusual. The equivalent certification basis may therefore include other special conditions or exemptions not pertinent to these special conditions.

Since noise certification and emission requirements are beyond the scope of the possible future bilateral agreement, the FAA will make findings of compliance with the applicable U.S. noise, fuel venting, and exhaust emission requirements. The U.S. noise certification basis for the Model Il–96T is 14 CFR part 36 of the FAR, as amended by Amendments 36–1 through 36–21, and any subsequent amendments that are applicable on the date on which the U.S. type certificate is issued. In addition to compliance with part 36, the statutory provisions of Public Law 92–574, ''Noise Control Act of 1972,'' require that the FAA issue a finding of regulatory adequacy pursuant to Section 611 of that Act. The Model Il–96T must also comply with the fuel venting and exhaust emission requirements of 14 CFR part 34 of the FAR, as amended by Amendment 34–1, and any subsequent amendments that are applicable on the date the type certificate is issued.

Special conditions are prescribed under the provisions of § 21.16 of the FAR when the applicable regulations for type certification do not contain adequate or appropriate standards because of novel or unusual design features. As discussed below, the new Ilyushin Model Il–96T airplane incorporates a number of such design features.

Il–96T Design Features

General

The Model Il–96T airplane presented for U.S. type certification is a long range, four engine, transport category cargo airplane powered by four (4) Pratt & Whitney PW2337 engines with 37,500 lbs. thrust ratings and incorporating Rockwell/Collins avionics. It is designed to be flown by a two-man crew; however, it incorporates seats for 2 additional crewmembers. The airplane is intended for cargo operation only and is designed to carry cargo on main and lower decks. The aircraft cargo loading system includes a large main deck cargo door (15.91 feet × 9.43 feet) and two lower deck cargo doors (8.69 feet × 5.74 feet). The main cargo compartment on the upper deck has a volume of 20,480 cubic feet and can accommodate 25 P–6 pallets. The two cargo compartments on the lower deck have a total volume of 6,900 cubic feet, and can accommodate a total of 32 LD–3 containers or 9 P–6 pallets. The Il–96T has a maximum takeoff weight of 595,240 lbs. and a maximum landing weight of 485,000 lbs. The maximum cruise altitude is 43,000 feet.

The structure of the Il–96T is generally of conventional design and construction. The landing gear system employs a center landing gear for use during ground handling conditions with heavy airplane weights. The structural design also makes use of an electronic flight control system which provides the potential for a wide range of structural and system interactions.

The Model Il–96T flight control system is an electro-hydromechanical system utilizing both fly-by-wire (FBW) and conventional mechanical (cables and push-pull rods) linkages between pilot control column and control surface hydraulic actuators in two simultaneously operated and synchronized channels. The conventional mechanical channel, in normal operation, functions as a passive redundancy of the FBW channel and provides feedback to the pilots via the Automatic Feel Load System.

Hydraulic power to the flight control system is simultaneously provided by four independent hydraulic systems. Functions are shared among these systems in order to ensure airplane control in the event of loss of one, two, or three systems. The four systems are pressurized by variable displacement pumps driven by the engine accessory gearbox. In addition, the systems can be powered by electrically driven pumps. A ram air turbine (RAT)-driven pump is available as an emergency hydraulic power source.

Normal electrical power is supplied by four constant frequency generators, one on each engine. An auxiliary power unit (APU) providing electrical and hydraulic supply is available for ground use only and is not used in flight. Five batteries provide an alternative source of electrical power for loads required to continue safe flight and landing in the case of failure of four generators.

The engine control system consists of a dual-channel electronic engine control (EEC) mounted on the fan case of each engine. Each EEC interfaces with various airplane computer systems. The EEC provides gas generator control, engine limit protection, power management, thrust reverser control, and engine parameter inputs for the flight deck displays. The engine EEC and associated airplane related systems form the complete propulsion control system.

Pitch and roll control inputs are made through conventional flight deck central control columns. The flight instruments are displayed on six cathode ray tube (CRT) displays. Two CRT's are mounted directly in front of both the pilot and copilot and display primary flight instruments and navigational information. The other two CRT's are located in the center of the instrument panel and display engine parameters, warnings, and system diagnostics.

The type design of the Model Il–96T contains novel or unusual design features not envisioned by the applicable part 25 airworthiness standards and therefore special conditions are considered necessary in the following areas:

Airframe

1. Center Landing Gear

The Ilyushin Il–96T landing gear arrangement includes a center braking landing gear under the fuselage. The center main landing gear does not differ from that of the right or left main landing gear in construction and performs the same functions. The current landing gear design criteria are applicable to conventional landing gear arrangements. Special Condition No. 1 provides additional taxi, takeoff, and landing criteria for this arrangement.

2. Design Maneuver Requirements

In a conventional airplane with a hydro-mechanical flight control system, pilot inputs directly affect control surface movement (both rate and displacement) for a given flight condition. In the Il–96T, the pilot's controls and the flight control surfaces are connected through the electronic flight control system, which introduces additional surface movements based on its design control laws. The control surface movement during maneuvers differs from the pilot control displacements in terms of both rate and displacement. The additional effects of the electronic flight control system are not reflected in the current FAR; therefore, Special Condition No. 2 is provided.

3. Interaction of Systems and Structure

The Ilyushin Model Il–96T is equipped with an electrical flight control system and a load alleviation system that effects both gust and maneuver loads. These systems can directly, or as a result of failure or malfunction, affect structural performance. This degree of system and structures interaction was not envisioned in the structural design regulations of part 25 of the FAR for transport airplanes. Special Condition 3 provides comprehensive criteria in which the structural design safety margins are dependent on systems reliability.

Systems

4. Protection From Unwanted Effects of High Intensity Radiated Fields (HIRF)

The use of fly-by-wire designs to command and control engines and flight control surfaces increases the airplane's susceptibility to HIRF sources external to the airplane. The airworthiness regulations do not provide adequate requirements for protection from unwanted effects of HIRF.

High intensity radiated fields have the potential to cause adverse and potentially hazardous effects on fly-by-wire systems if design measures are not taken to ensure the immunity of such systems. This is particularly true with the trend toward increased power levels from ground based transmitters and the advent of space and satellite communications.

The Model Il–96T is being designed with electrical interfaces between crew inputs and (1) the flight control surfaces, and (2) the engines. These interfaces, and the interconnection among the electronic subsystems controlling these functions, can be susceptible to disruption of both command/response signals and the operational mode logic as a result of electrical and magnetic interference. Traditional airplane designs have utilized mechanical means to connect the primary flight controls and the engine to the flight deck. This traditional design results in control paths that are substantially immune to the effects of HIRF. A special condition is required to ensure that critical and essential systems be designed and installed to preclude component damage and system upset or malfunction due to the unwanted effects of HIRF. Therefore, Special Condition No. 4 is provided.

Special conditions may be issued and amended, as necessary, as part of the type certification basis if the Administrator finds that the airworthiness standards designated in accordance with § 21.17(a)(1) do not contain adequate or appropriate safety standards because of novel or unusual design features of an airplane.

Special conditions, as appropriate, are issued in accordance with § 11.49 after public notice, as required by §§ 11.28 and 11.29(b), effective October 14, 1980, and become part of the type certification basis in accordance with § 21.17(a)(2).

Discussion of Comments

Notice of proposed special conditions No. SC–97–2–NM was published in the **Federal Register** on April 9, 1997 (62 FR 17117). No comments were received, and the special conditions are adopted as proposed.

Applicability

These special conditions are applicable initially to the Ilyushin Model Il–96T airplane. Should Ilyushin Aviation Complex apply at a later date for a change to the type certificate to include another model incorporating the same novel or unusual design features, the special conditions would apply to that model as well under the provisions of § 21.101(a)(1).

Conclusion

This action affects only certain unusual or novel design features on one model series of airplanes. It is not a rule of general applicability and affects only the manufacturer who applied to the FAA for approval of these features on the airplane.

List of Subjects in 14 CFR Part 25

Aircraft, Aviation Safety, Reporting and recordkeeping requirements.

The authority citation for these special conditions is as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701, 44702, 44704.

The Special Conditions

Accordingly, pursuant to the authority delegated to me by the Administrator, the following special conditions are issued as part of the type certification basis for the Ilyushin Aviation Complex Model Il–96T series airplanes.

1. *Center Landing Gear.* Notwithstanding § 25.477 of the FAR, the requirements of §§ 25.473 and 25.479 through § 25.485 apply, except as noted:

(a) In addition to the requirements of § 25.473, landing should be considered on a level runway and on a runway having a convex upward shape that may be approximated by a slope of 1.5 percent with the horizontal at main landing gear stations. The maximum loads determined from these two conditions must be applied to each main landing gear and to the center landing gear.

(b) The requirements of § 25.483 apply and, in addition, the condition represented by the following figure also applies:

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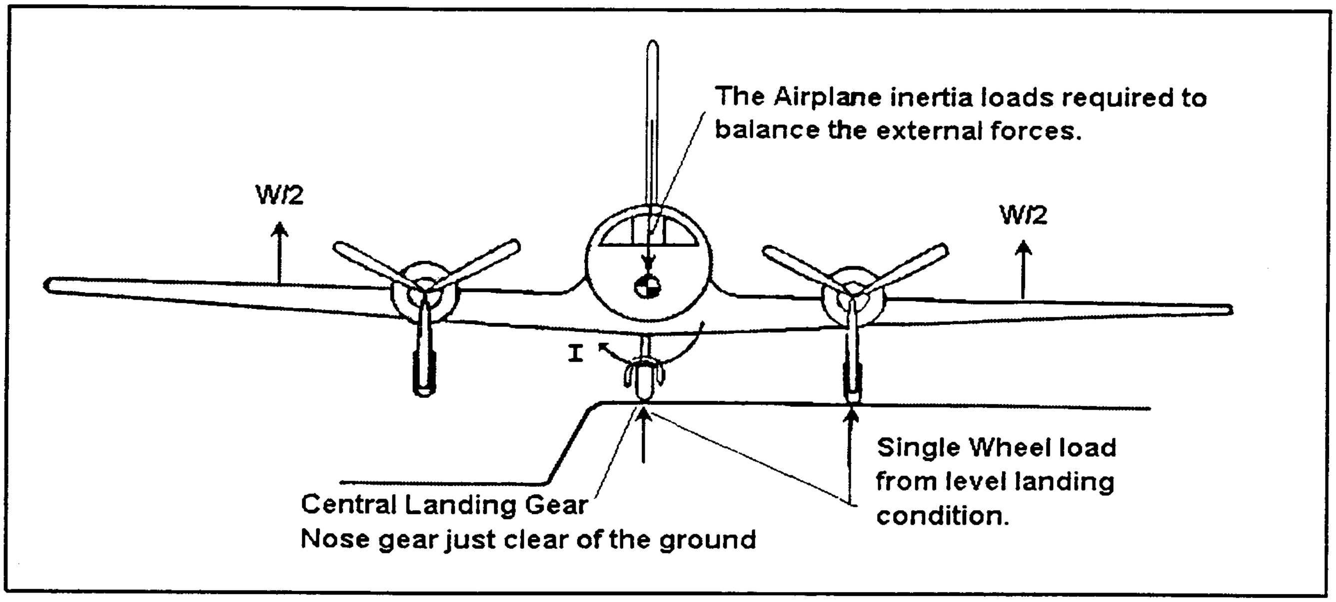
Figure 1. Center gear landing Condition



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(c) In lieu of the requirements of § 25.485, the following apply:

(1) The airplane is considered to be in the level attitude with only the main and central wheels contacting the ground.

(2) Vertical reactions of one-half of the maximum vertical reaction obtained at each main and center gear in the level landing conditions should be considered. The vertical loads must be combined with side loads that for the main gear are 0.8 of the vertical reaction (on one side) acting inward and 0.6 of the vertical reaction (on the other side) acting outward, and for the center gear are 0.7 of the vertical reaction acting in the same direction as main gear side loads. (Drag load=0)

(d) In addition to the requirements of § 25.489, ‘‘Ground handling conditions,’’ the following applies: The airplane should be considered to be on a level runway and on a runway having a convex upward shape that may be approximated by a slope of 1.5 percent with the horizontal at main landing gear stations. The ground reactions must be distributed to the individual landing gear units in a rational or conservative manner (zero lift, shock struts in the static position).

(e) In lieu of the requirements of § 25.503, the following apply:

(1) The airplane is assumed to pivot about one of the outer main gears with the brakes locked on the selected gear. The limit vertical load factor must be 1.0 and the coefficient of friction must be 0.8.

(2) The airplane is assumed to be in static equilibrium, with the loads being applied at the ground contact points.

(3) All of the main gear units must be designed for the scrubbing or torsion loads, or both, induced by pivoting during ground maneuvers produced by:

(i) Towing at the nose gear, no brakes applied; and

(ii) Application of symmetrical or unsymmetrical forward thrust to aid pivoting and with or without braking on the outside main gear closest to the pivot center.

(f) The following applies to the center landing gear in lieu of § 25.723, ‘‘Shock absorption tests’’:

(1) The center landing gear should not fail in a test demonstrating its reserve energy absorption capacity at design landing weight, assuming airplane lift no greater than the airplane weight acting during an impact simulating:

(i) A center landing gear descent velocity of 120 percent of the maximum aircraft descent velocity at the time of center landing gear ground contact; or

(ii) A 12 fps airplane landing impact taking into account both the main and center landing gears acting during the impact, whichever is more critical.

2. *Design Maneuver Requirements.* (a) *Maximum elevator displacement at* V_A. In lieu of compliance with § 25.331(c)(1) of the FAR, the airplane is assumed to be flying in steady level flight (point A1 within the maneuvering envelope of § 25.333(b)) and, except as limited by pilot effort as specified in § 25.397 concerning pilot effort forces, the cockpit pitching control device is suddenly moved to obtain extreme positive pitching acceleration (nose up). In defining the tail load condition, the response of the airplane must be taken into account. Airplane loads which occur subsequent to the point at which the normal acceleration at the center of gravity exceeds the maximum positive limit maneuvering factor, n, need not be considered.

(b) *Pitch maneuvering loads induced by the system.* In addition to the requirements of § 25.331(c) of the FAR, it must be established that pitch maneuver loads induced by the system itself (e.g. abrupt changes in orders made possible by electrical rather than mechanical combination of different inputs) are acceptably accounted for.

(c) *Roll maneuver loads.* In lieu of compliance with § 25.349(a) of the FAR, the following conditions, speeds, spoiler and aileron deflections (except as the deflections may be limited by pilot effort) must be considered in combination with an airplane load factor of zero and of two-thirds of the positive maneuvering factor used in design. In determining the required aileron and spoiler deflections, the torsional flexibility of the wing must be considered in accordance with § 25.301(b).

(1) Conditions corresponding to steady rolling velocities must be investigated. In addition, conditions corresponding to maximum angular

acceleration must be investigated. For the angular acceleration conditions, zero rolling velocity may be assumed in the absence of a rational time history investigation of the maneuver.

(2) At V_A, sudden deflection of the cockpit roll control up to the limit is assumed. The position of the cockpit roll control must be maintained until a steady roll rate is achieved and then must be returned suddenly to the neutral position.

(3) At V_C, the cockpit roll control must be moved suddenly and maintained so as to achieve a rate of roll not less than that obtained in paragraph (2).

(4) At V_D, the cockpit roll control must be moved suddenly and maintained so as to achieve a rate of roll not less than one third of that obtained in paragraph (2) of this paragraph.

(5) It must also be established that roll maneuver loads induced by the system itself (i.e., abrupt changes in orders made possible rather than mechanical combination of different inputs) are acceptably accounted for.

(d) *Yaw maneuver loads.* In lieu of compliance with § 25.351 of the FAR, the airplane must be designed for loads resulting from the conditions specified in subparagraphs (a) and (b) of this paragraph. Unbalanced aerodynamic moments about the center of gravity must be reacted in a rational or conservative manner, considering the principal masses furnishing the reacting inertia forces. Physical limitations of the airplane from the cockpit yaw control device to the control surface deflection, such as control stop position, maximum power and displacement rate of the servo controls, and control law limiters may be taken into account.

(1) Maneuvering. At speeds from V_{MC} to V_D, the following maneuvers must be considered. In computing the tail loads, the yawing velocity may be assumed to be zero:

(i) With the airplane in unaccelerated flight at zero yaw, it is assumed that the cockpit yaw control device (pedal) is suddenly displaced (with critical rate) to the maximum deflection, as limited by the stops.

(ii) With the cockpit yaw control device (pedal) deflected as specified in subparagraph (1) of this paragraph, it is assumed that the airplane yaws to the resulting sideslip angle (beyond the static sideslip angle).

(iii) With the airplane yawed to the static sideslip angle with the cockpit yaw control device deflected as specified in sub-paragraph (1) of this paragraph, it is assumed that the cockpit yaw control device is returned to neutral.

3. *Interaction of Systems and Structure.* (a) *General.* For an airplane equipped with flight control systems, load alleviation systems, or flutter control systems that directly, or as a result of a failure or malfunction, affect its structural performance, the influence of these systems and their failure conditions shall be taken into account in showing compliance with subparts C and D of part 25 of the FAR.

(b) *System fully operative.* With the system fully operative, the following apply:

(1) Limit loads must be derived in all normal operating configurations of the systems from all the deterministic limit conditions specified in subpart C, taking into account any special behavior of such systems or associated functions, or any effect on the structural performance of the airplane that may occur up to the limit loads. In particular, any significant nonlinearity (rate of displacement of control surface, thresholds, or any other system nonlinearities) must be accounted for in a realistic or conservative way when deriving limit loads from limit conditions.

(2) The airplane must meet the strength requirements of part 25 (static strength, residual strength), using the specified factors to derive ultimate loads from the limit loads defined above. The effect of nonlinearities must be investigated beyond limit conditions to ensure the behavior of the systems presents no anomaly compared to the behavior below limit conditions. However, conditions beyond limit conditions need not be considered when it can be shown that the airplane has design features that make it impossible to exceed those limit conditions.

(3) The airplane must meet the aeroelastic stability requirements of § 25.629.

(c) *System in the failure condition.* For any system failure condition not shown to be extremely improbable, the following apply:

(1) *At the time of occurrence.* Starting from 1g level flight conditions, a realistic scenario, including pilot corrective actions, must be established to determine the loads occurring at the time of failure and immediately after failure. The airplane must be able to withstand these loads, multiplied by an appropriate factor of safety, related to the probability of occurrence of the failure. These loads should be considered as ultimate loads for this evaluation. The factor of safety is defined as follows:

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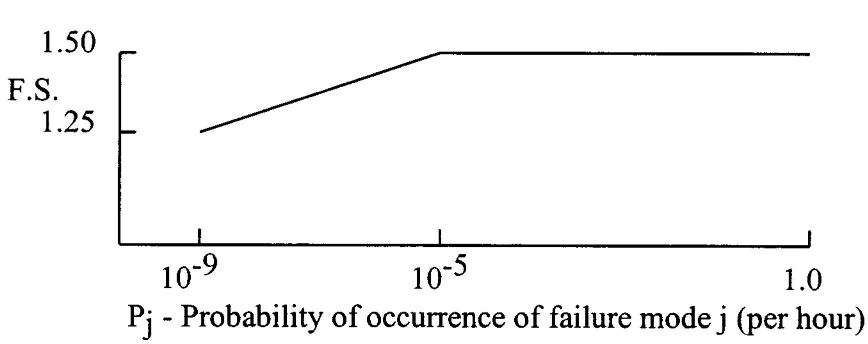
Factor of Safety at Time of Occurrence



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(i) The loads must also be used in the damage tolerance evaluation required in § 25.571(b), if the failure condition is probable. The loads may be considered as ultimate loads for the damage tolerant evaluation.

(ii) Freedom from flutter and divergence must be shown at speeds up to V_D or 1.15 V_C, whichever is greater. However, at altitudes where the speed is limited by Mach number, compliance need be shown only up to M_D, as defined in § 25.335(d). For failure conditions that result in speed increases beyond V_C/M_C, freedom from flutter and divergence must be shown at increased speeds, so that the above margins are maintained.

(iii) Notwithstanding subparagraph (1) of this paragraph, failures of the system that result in forced structural vibrations (oscillatory failures) must not produce peak loads that could result in permanent deformation of primary structure.

(2) *For the continuation of the flight.* For the airplane, in the failed configuration and considering any appropriate flight limitations, the following apply:

(i) Static and residual strength must be determined for loads induced by the failure condition, if the loads could continue to the end of the flight. These loads must be combined with the deterministic limit load conditions specified in subpart C.

(ii) For static strength substantiation, each part of the structure must be able to withstand the loads specified in subparagraph (2)(i) of this paragraph multiplied by a safety factor depending on the probability of being in this failure state.

The factor of safety is defined as follows:

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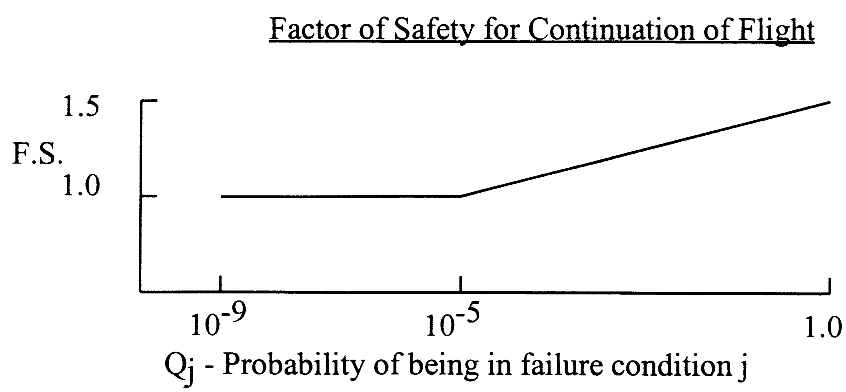

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Qj=(Tj)(Pj) where:

Tj=Average time spent in failure condition j (in hours)

Pj=Probability of occurrence of failure mode j (per hour)

Note: If Pj is greater than 10^{-3} per flight hour, then a 1.5 factor of safety must be used.

(iii) For residual strength substantiation as defined in § 25.571(b), for structures also affected by failure of the system and with damage in combination with the system failure, a reduction factor may be applied to the residual strength loads of § 25.571(b). However, the residual strength level must not be less than the 1g flight load, combined with the loads introduced by the failure condition plus two-thirds of the load increments of the conditions specified in § 25.571(b) in both positive and negative directions (if appropriate). The reduction factor is defined as follows:

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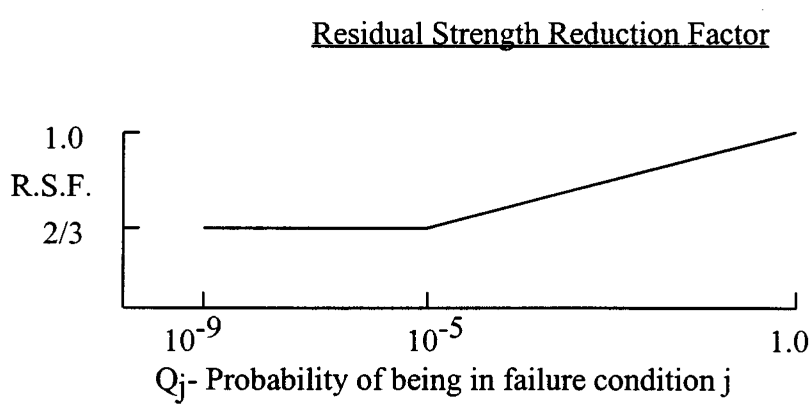

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Qj=(Tj)(Pj) where:

Tj=Average time spent in failure condition j (in hours)

Pj=Probability of occurrence of failure mode j (per hour)

Note: If Pj is greater than 10^{-3} per flight hour, then a residual strength factor of 1.0 must be used.

(iv) Freedom from flutter and divergence must be shown up to a speed determined by the following figure:

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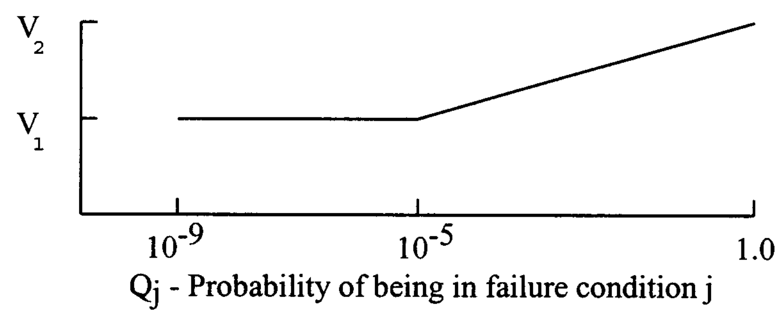
Flutter Clearance Speed



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V_1=Clearance speed as defined in § 25.629(b)(2).
V_2=Clearance speed as defined in § 25.629(b)(1).
Qj=(Tj)(Pj) where:
Tj=Average time spent in failure condition j (in hours)
Pj=Probability of occurrence of failure mode j (per hour)

Note: If Pj is greater than 10^{-3} per flight hour, then the flutter clearance speed must not be less than V_2.

(v) Freedom from flutter and divergence must also be shown up to V_1 in the above figure for any probable system failure condition combined with any damage required or selected for investigation in § 25.571(b).

(vi) If the time likely to be spent in the failure condition is not small compared to the damage propagation period, or if the loads induced by the failure condition may have a significant influence on the damage propagation, then the effects of the particular failure condition must be addressed and the corresponding inspection intervals adjusted to adequately cover this situation.

(vii) If the mission analysis method is used to account for continuous turbulence, all the systems failure conditions associated with their probability must be accounted for in a rational or conservative manner in order to ensure that the probability of exceeding the limit load is not higher than the prescribed value of the current requirement.

(d) *Warning considerations.* For system failure detection and warning, the following apply:

(1) Before flight, the system must be checked for failure conditions, not shown to be extremely improbable, that degrade the structural capability of the airplane below the level intended in paragraph (b) of this special condition. The crew must be made aware of these failures, if they exist, before flight.

(2) An evaluation must be made of the necessity to signal, during the flight, the existence of any failure condition that could significantly affect the structural capability of the airplane and for which the associated reduction in airworthiness can be minimized by suitable flight limitations. The assessment of the need for such signals must be carried out in a manner consistent with the approved general warning philosophy for the airplane.

(3) During flight, any failure condition not shown to be extremely improbable, in which the safety factor existing between the airplane strength capability and loads induced by the deterministic limit conditions of subpart C of part 25 is reduced to 1.3 or less, must be signaled to the crew if appropriate procedures and limitations can be provided so that the crew can take action to minimize the associated reduction in airworthiness during the remainder of the flight.

(e) *Dispatch with failure conditions.* If the airplane is to be knowingly dispatched in a system failure condition that reduces the structural performance of the airplane, then operational limitations must be provided whose effects, combined with those of the failure condition, allow the airplane to meet the structural requirements described in paragraph (b) of this special condition. Subsequent system failures must also be considered.

Discussion: This special condition is intended to be applicable to flight controls, load alleviation systems, and flutter control systems. The criteria provided by the special condition only address the direct structural consequences of the systems responses and performances and therefore cannot be considered in isolation but should be included in the overall safety evaluation of the airplane. The presentation of these criteria may, in some instances, duplicate standards already established for this evaluation. The criteria are applicable to structure, the failure of which could prevent continued safe flight and landing. The following definitions are applicable to this special condition:

Structural performance: Capability of the airplane to meet the structural requirements of part 25.

Flight limitations: Limitations that can be applied to the airplane flight conditions following an inflight occurrence and which are included in the flight manual (e.g., speed limitations, avoidance of severe weather conditions, etc.).

Operational limitations: Limitations, including flight limitations, that can be applied to the airplane operating conditions before dispatch (e.g., payload limitations).

Probabilistic terms: The probabilistic terms (probable, improbable, extremely improbable) used in this special condition should be understood as defined in AC 25.1309–1.

Failure condition: The term failure condition is defined in AC 25.1309–1; however, this special condition applies only to system failure conditions that have a direct impact on the structural performance of the airplane (e.g., failure conditions that induce loads or change the response of the airplane to inputs such as gusts or pilot actions).

4. *Protection from Unwanted Effects of High Intensity Radiated Fields (HIRF).* In the absence of specific requirements for protection from the unwanted effects of HIRF, the following apply:

Each airplane system that performs critical functions must be designed and installed to ensure that the operation and operational capabilities of these systems to perform critical functions are not adversely affected when the airplane is exposed to high intensity radiated fields.

Discussion: The Ilyushin Model Il–96T will utilize electrical and electronic systems that perform critical functions. These systems include the electronic displays, integrated avionics computer, electronic engine controls, etc. The existing airworthiness regulations do not contain adequate or appropriate safety standards for the protection of these systems from the effects of HIRF which are external to the airplane.

Airplane designs that utilize metal skins and mechanical command and control means have traditionally been shown to be immune from the effects of HIRF energy from ground-based and airborne transmitters. With the trend toward increased power levels from these sources, plus the advent of space and satellite communications, the immunity of the airplane to HIRF energy must be established. No universally accepted guidance to define the maximum energy level in which civilian airplane system installations must be capable of operating safely has been established.

For the purposes of this special condition, the following definition applies:

Critical Functions: Functions whose failure would contribute to or cause a failure condition that would prevent the continued safe flight and landing of the airplane. At this time the FAA and other airworthiness authorities are unable to precisely define or control the HIRF energy level to which the airplane will be exposed in service. Therefore, the FAA hereby defines two acceptable interim methods for complying with the requirement for protection of systems that perform critical functions.

(1) The applicant may demonstrate that the critical systems, as installed in the airplane, are protected from the external HIRF threat environment defined in the following table:

Frequency	Field peak (V/M)	Strength average V/M
10 KHz-500 KHz	60	60
500 KHz-2 MHz	80	80
2 MHz-30 MHz	200	200
30 MHz-100 MHz	33	33
100 MHz-200 MHz	150	33
200 MHz-400 MHz	56	33
400 MHz-1 GHz	4,020	935
1 GHz-2 GHz	7,850	1,750
2 GHz-4 GHz	6,000	1,150
4 GHz-6 GHz	6,800	310
6 GHz-8 GHz	3,600	666
8 GHz-12 GHz	5,100	1,270
12 GHz-18 GHz	3,500	551
18 GHz-40 GHz	2,400	750

or,

(2) The applicant may demonstrate by laboratory test that the critical systems elements and their associated wiring harnesses can withstand a peak electromagnetic field strength of 100 volts per meter, without the benefit of airplane structural shielding, in the frequency range of 10 KHz to 18 GHz.

Compliance Method: This paragraph describes an acceptable method of showing compliance with the HIRF energy protection requirements.

(1) *Compliance Plan:* The applicant should present a plan for Aviation Register approval, outlining how compliance with the HIRF energy protection requirements will be attained. This plan should also propose pass/fail criteria for the operation of critical systems in the HIRF environment.

(2) *System Criticality:* A hazard analysis should be performed by the applicant for approval by Aviation Register to identify electrical and/or electronic systems which perform critical functions. These systems are candidates for the application of HIRF energy protection requirements.

(3) *Compliance Verification:* Compliance with the HIRF energy protection requirements may be demonstrated by tests, analysis, models, similarity with existing systems, or a combination thereof as acceptable to Aviation Register. Service experience alone is not acceptable since such experience in normal flight operations may not include an exposure to the HIRF environmental condition.

(4) *Pass/Fail Criteria:* Acceptable system performance is attained by demonstrating that the system under consideration continues to perform its intended function during and after exposure to the required electromagnetic fields. Deviations from system specification may be acceptable depending on an independent assessment of the deviations for each application.

(5) *Test Methods and Procedures:* RTCA document DO–160C, Section 20, provides information on acceptable test procedures. In addition, the following information on modulation is presented to supplement that found in DO–160C. Equipment and subsystem radiated susceptibility qualification tests should be conducted by slowly scanning the entire frequency spectrum with an unmodulated signal which produces the required average electric field strength as the equipment under test (EUT) and its wiring. A peak level detector should be used to monitor the peak values of the signal and these values should be recorded at each test point. The EUT should not be damaged by this test and should operate normally for frequencies under 400 MHz. Deviations from normal operation for test frequencies above 400 MHz should be recorded. The test should be repeated with an appropriate modulation applied to the test signal. At each test point, the amplitude of the RF test signal should be adjusted to the peak values recorded during the unmodulated test. The modulation should be selected as the signal most likely to disrupt operation of the equipment under test based on its design characteristics. For example, flight control systems might be susceptible to 3 Hz square wave modulation while the video signals for CRT displays may be susceptible to 400 Hz sinusoidal modulation. If the worst case modulation is unknown or cannot be determined, default modulations can be used. Suggested default values are 1 KHz sine wave with 80% depth of modulation in the frequency range from 10 KHz to 400 MHz and 1 KHz square wave with greater than 90% depth of modulation from 400 MHz to 18 GHz. For frequencies where the unmodulated signal caused deviations from normal operation of the EUT, several different modulating signals with various wave-forms and frequencies should be applied. Modern laboratory equipment may not be able to continuously scan the spectrum in the manner of analog equipment. These units will only generate discrete frequencies. For such equipment, the number of test points and the dwell time at each test point must be specified. For each decade of the frequency test spectrum (a ten times increase in frequency (i.e., 10 Kz to 100 KHz) there should be at least 25 test points, and for the decades from 10 MHz to 100 MHz, and 100 MHz to 1 GHz there should be a minimum of 180 test points each. The dwell time at each test point should be at least 0.5 second.

(6) *Data Submittal:* An accomplishment report should be submitted to the Aviation Register showing fulfillment of the HIRF energy protection requirements. This report should contain test results, analysis and other pertinent data.

(7) *Maintenance Requirements:* The applicant (manufacturer) must provide maintenance requirements to assure the continued airworthiness of the installed system(s).

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