April 23, 2002

USDA – National Interagency Fire Center
Attn: Richard M. Willis
Dennis Lamun
3833 S Development Avenue
Boise, ID 83705

Dear Gentlemen:

In regards to your letter dated April 17, 2002 we hope that the following information is helpful. Our company has developed operational guidelines for the C-130 aircraft that we expect our pilots to follow. The company operating procedures were developed based on the advice of the Lockheed engineers who assisted us in the development of the C-130 structural wing repairs. There are several procedural items that Hawkins and Powers has tried to implement. One of these items is how our pilots will use fuel balance to provide a structural advantage for the aircraft wings. This was done by first reducing the additional cargo (we no longer carry heavy spares, i.e.: G.T.C.s, etc.) and then slightly increasing the amount of fuel we carry. We have also advised our pilots to increase the outboard to inboard fuel balance by 900 pounds (all in accordance with the limitations of the aircraft flight manual). The auxiliary and pylon tanks have been removed and disabled; we only use the four main fuel tanks. The other item you address is a reduction in airspeed. This year, during spring training and prior to start of contract, we have reviewed with our crews and emphasized adherence to flight manual limitations. We expect our pilots to follow the airspeed and weight limitations set in the aircraft flight manual, as well as those set by the F.A.A. In adjusting our fuel management procedures, we have actually increased the aircrafts permissible load factors and thus increased the allowable speed limits. Our company operating procedure simply provides a quick reference for our pilots, and guides them to the flight manual. Specifically, we guide the pilots to T.O. 1C-130A-1 Figure 5-5 on pages 5-14 and 5-15 and page 7-18.

Your letter states that "It has come to our attention that... fuel is being carried in the inboard auxiliary tanks... and that a reduction in speed during flight has occurred as well." How this miscommunication occurred I do not know for certain. I believe it may have originated during the previous fire season. I believe that since last season our training and operations department has clearly communicated our intent to the C-130 crews. We apologize for any inconvenience and assure you that by increasing emphasis on safe and prudent operations we have not compromised speed and efficiency.

Sincerely,

Hawkins & Powers Aviation, Inc.

[redacted]

Ryan Powers

cc: Terry Cullen

United States Department of Agriculture | Forest Service | National Interagency Fire Center | 3833 S. Development Ave. Boise, ID 83705

File Code: 6320

Date: April 17, 2002

HAWKINS & POWERS AVIATION INC
2441 HWY 20 WEST
GREYBULL, WY 82426

Dear Gentlemen:

It has come to our attention that Hawkins & Powers may have implemented a policy regarding the flight configuration envelope of the C-130 aircraft when carrying retardant loads.

Our understanding of this policy is that fuel is being carried in the inboard auxiliary tanks for safety purposes and that a reduction in speed during flight has occurred as well.

We are sensitive to the need to enhance safety of flight for fire suppression operations, however, when aircraft performance issues are impacted, we need to he advised so we may be able to determine the effects on the overall program.

Needless to say, issues affecting aircraft speed may result in performance efficiency issues requiring evaluation by the Government.

Please advise this office of your current flight envelope policy for operation of the C-130s so we may determine what affect, if any, it may have on the airtanker program.

Sincerely,

[redacted]
RICHARD M. WILLIS
Contracting Officer

[redacted]
DENNIS LAMUN
Chairman, Interagency Airtanker Board

cc. Terry Cullen, Acting Light Fixed Wing Specialist
Asher Williams, NAOO

3. LANDING GEAR OPERATION:

Do not exceed 170 KIAS while the landing gear is being extended or retracted.

4. LANDING GEAR EXTENDED:

Do not exceed 170 KIAS with the landing gear extended.

5. LANDING GEAR DOORS REMOVED:

Flight with the doors removed will be accomplished only when authorized by the major command concerned.

Maximum speed 200 KIAS.

Flight is only permitted with the various doors removed in the following manner.

Main Landing Gear - All doors of the affected wheel well must be removed.

Nose Landing Gear - (1) Both forward and aft doors removed, or (2) Aft nose door removed with forward door installed.

CAUTION

Flight is not permitted with the forward nose gear door removed and the aft door installed.

6. AFT CARGO DOOR AND/OR RAMP OPEN:

Do not exceed 150 KIAS with the ramp, (or ramp and aft cargo door) open regardless of whether the paratroop doors are open or closed or the position of the paratroop air deflectors. Do not exceed 135 KIAS with ramp up and locked and aft cargo door open.

7. PARATROOP AIR DEFLECTORS:

Do not exceed 150 KIAS when operating the paratroop air deflectors or with the air deflectors extended regardless of whether the paratroop doors are open or closed.

8. PARATROOP DOORS:

Do not exceed 150 KIAS with the paratroop doors open, except for contingency operations when authorized by the major air commands.

9. LANDING LIGHTS EXTENDED:

Do not exceed 170 KIAS during extension or retraction of landing lights or with landing lights extended.

10. PAINTED FLIGHT CONTROL SURFACES:

Do not exceed 250 KIAS when any flight control surface is painted, unless the following has been accomplished:

a. The underside of the ailerons and elevators and either side of the rudder have been stenciled as follows:

CAUTION

Subsequent repainting restricted to minor touch-ups unless performed at depot level.

11. INOPERATIVE WINDSHIELD/WINDOW ANTI-ICING.

Do not exceed 185 KIAS with inoperative windshield/window anti-icing below 10,000 feet altitude.

ACCELERATION LIMITATIONS

Never exceed the structurally safe maneuver load factor for the applicable flight conditions and for the airplane load distribution. The limit load factor for fuel load and cargo load combinations is given in the weight limitations chart (figure 5-5). Airplanes are equipped with an accelerometer for the determination of g loading. Since feel is often misleading, particularly when the pilot's attention is diverted or distracted, abrupt and unnecessary maneuvering must always be avoided.

LOAD FACTORS

A load factor is the ratio of the load imposed on an object to the weight of the object. It is expressed in terms of g's, 1.0g being 1 times the weight of the object. The letter "g" stands for

TURBULENCE AND THUNDERSTORMS

Rain has no adverse aerodynamic effects on the airplane. At cruise speeds, however, visibility through the windshields will be reduced by streaking, as the windshield wipers are ineffective at speeds above approximately 180 KIAS.

Flying under conditions of extreme turbulence, such as through thunderstorms, should be avoided. When flying under conditions of low visibility, clear passage around or between thunderstorms can usually be found with the navigation and search radar. The possibility remains, however, that a storm cannot be avoided, or that flight through a storm may be a matter of military necessity.

Recommended airspeed for penetration into severe turbulence is 65 knots above power-off stall speed not to exceed 180 KIAS. A comfortable speed in light to moderate turbulence is 180 KIAS.

The autopilot may be used, and in some cases is desirable. The altitude hold mode should be disengaged and the autopilot should not be either assisted or overpowered in the autopilot mode. If autopilot cannot control attitude, disengage and fly manually.

COLD-WEATHER PROCEDURES

During extreme cold weather rubber, plastic, and fabric materials stiffen and may crack, craze, or even shatter when loads are applied. Oils and lubricants congeal. Adjoining metals contract differentially, and could result in adverse variations in tolerances. Moisture, usually from condensation or melted ice, freezes in critical areas. Tire, landing gear strut, fire extinguisher bottle, and accumulator air pressures decrease with a temperature decrease. Extreme diligence on the part of both ground and flight crews is required to ensure successful cold-weather operation. The procedures and precautions outlined here pertain to operating unhangared airplanes in cold weather and are in addition to the normal procedures given in Section II.

NOTE

- Cold weather procedures are generally considered to be applicable when the temperature is 0°C (32°F) and below.
- A preheating period will be arranged by the ground crew using portable ground heaters or the gas turbine compressor so that airplane components will be warmed and inspected prior to starting the engines.

PREFLIGHT CHECK.

Perform a normal preflight inspection of the airplane as outlined in Section II. In particular, check the following:

1. Check for removal of all exterior protective covers not required for heating airplane.

CAUTION

- Ensure that all ice, snow, heavy frost is removed from the entire airplane and no moisture is allowed to remain in critical areas where it may refreeze.
- Do not attempt to scrape or chip ice from flight surfaces or fuselage. Exercise care to prevent personnel injury from slipping and falling.

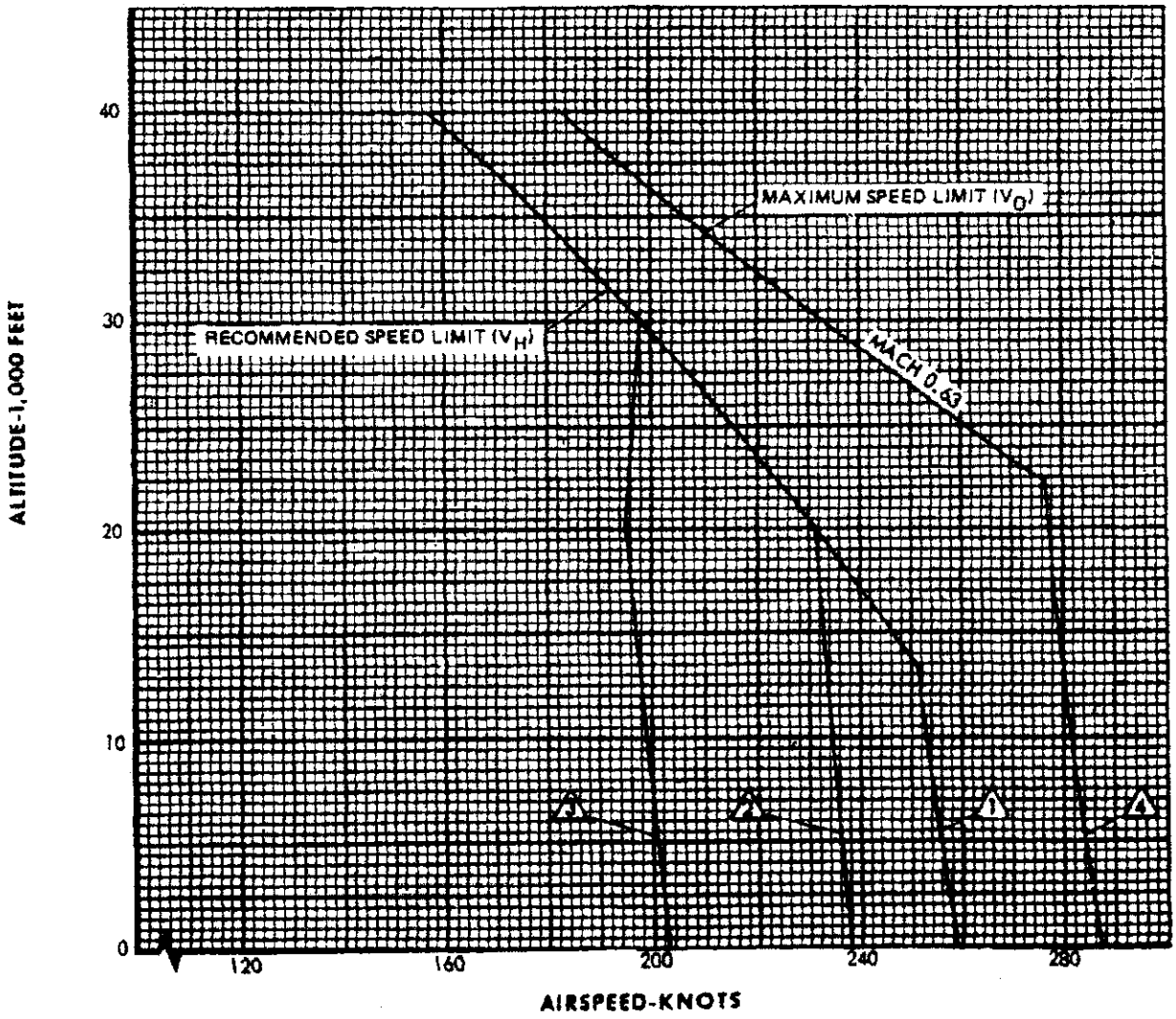
WARNING

Do not attempt take-off with ice, snow or frost on the wings or empennage. The roughness caused by ice and snow on the surfaces varies the airfoil shape with a resulting loss of efficiency. Take-off run is increased and rate of climb is decreased. Stall speed is increased and stall characteristics are unpredictable.

limit flight speed vs altitude chart

MODELS: C-130A
ENGINES: T56-A-9

DATA BASIS: FLIGHT TEST



NOTE

RECOMMENDED SPEED LIMIT

1. V_H - MANEUVER LOAD FACTOR LIMITS ARE -1.0G TO 3.0G. USE WITH AREA A OF SHEET 2.
2. V_H - MANEUVER LOAD FACTOR LIMITS ARE -1.0G TO 2.5G. USE WITH AREA B OF SHEET 2.
3. V_H - MANEUVER LOAD FACTOR LIMITS ARE 0.0G TO 2.0G. USE WITH AREA C OF SHEET 2.

MAXIMUM SPEED LIMIT

4. V_D - MANEUVER LOAD FACTOR LIMITS ARE 0.0G TO 2.5G FOR AREAS A AND B OF SHEET 2 AND 0.0G TO 2.0G FOR AREA C OF SHEET 2.

5. FOR THUNDERSTORM OPERATION, REDUCE AIRSPEED TO 65 KNOTS ABOVE POWER-OFF STALL SPEED NOT TO EXCEED 180 KIAS.
6. NORMAL PENETRATIONS UP TO 250 KIAS ARE PERMISSIBLE IN SMOOTH TO MODERATELY TURBULENT AIR BELOW 20,000 FEET.

Figure 5 – 5 (Sheet 1 of 2)

The following table demonstrates the estimated loss of range due to boil-off when using aviation gasoline:

Fuel Temperature	Approximate loss of range when climbing to these cruise altitudes 25,000 Ft.	35,000 Ft.
125°F	12 percent	20 percent
110°F	8 percent	15 percent
90°F	3 percent	10 percent
70°F	0 percent	5 percent

EFFECT OF ALTERNATE FUEL ON RANGE

The BTU content per pound of all fuels does not vary significantly, therefore, the range will depend primarily on the pounds of fuel aboard.

AIRSPEED LIMITATIONS

The limiting airspeed for a mission is interrelated with the cargo weight and maneuver load factors required for the mission and the gust load that may be encountered in turbulence. Recommended and maximum airspeed limits are shown on the limit flight speed vs altitude chart of figure 5-5, sheet 1 of 2. These speeds are referenced to specific fuel-cargo combinations on the weight limitations chart, figure 5-5, and to the allowable maneuver load factors. Any cruise speed up to the recommended speed may be utilized up to and including moderate turbulence.

NOTE

Operation in the areas between recommended speed limits and maximum speed limits is permissible for initiating penetrations from 20,000 feet at 250 KIAS provided the corresponding maneuver load factors are not exceeded.

CAUTION

Maximum speed limits should never be exceeded. Maneuver load factors and weight limitations (figure 5-5) should be carefully observed.

The airplane should not be operated in conditions of severe turbulence because gusts can be encountered that may impose excessive loads. However, if flight in severe turbulance cannot be avoided, flight should be in the range of 65 knots above power-off stalling speed for the operating gross weight not to exceed 180 KIAS. (figure 6-1.)

Never exceed the following indicated airspeeds for the condition noted:

1. MORE THAN 2,000 POUNDS OF PYLON TANK FUEL:

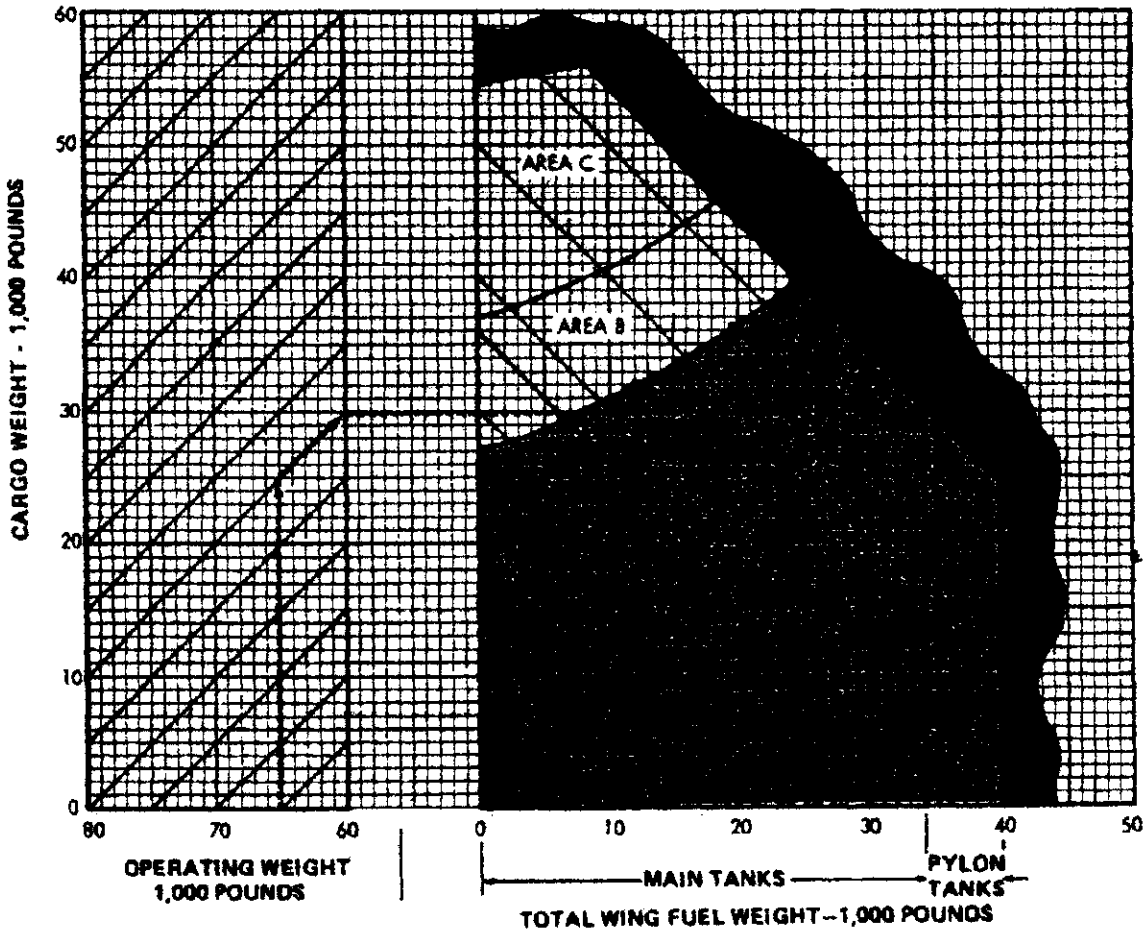
To prevent excessive loads in rough air when operating at gross weights of less than 115,000 pounds with more than 2,000 pounds of pylon tank fuel, the following airspeeds should not be exceeded:

Gross Weight	Airspeed (KIAS)
73,000 pounds	185
96,000 pounds	212
115,000 pounds	250

2. FLAPS EXTENDED:

Percentage	Airspeed (KIAS)
10	220
20	210
30	200
40	190
50	180
60	165
70	155
80	150
90	145
100	145

weight limitations chart



AREA A – RECOMMENDED – CARGO–FUEL COMBINATIONS FOR 3.0G MANEUVER LOAD FACTOR WITH V_H (1) OF SHEET 1.

AREA B – RECOMMENDED – CARGO–FUEL COMBINATIONS FOR 2.5G MANEUVER LOAD FACTOR WITH V_H (2) OF SHEET 1.

AREA C – CAUTIONARY – PERMISSIBLE AT LOAD FACTORS UP TO 2.0G WITH V_H (3) OF SHEET 1. EXCEEDING THE LIMIT LOAD FACTOR OR PERMISSIBLE AIRSPEED CAN RESULT IN STRUCTURAL DAMAGE TO THE AIRPLANE.

AREA D – NOT RECOMMENDED

NOTE CONTINUED:

7. THIS FIGURE IS BASED ON THE FUEL MANAGEMENT PROCEDURES IN SECTION I AND ON THE STANDARD DAY DENSITY OF JP-4 (6.5 POUNDS/GAL.). IT IS PERMISSIBLE TO REFUEL THE AIRPLANE TO ITS VOLUME CAPACITY WITH JP-6 (STANDARD DAY DENSITY OF 6.8 POUNDS/GAL.).

(8) LANDING RATE OF SINK LIMIT IS 540 FPM UP TO 98,000 POUNDS GROSS WEIGHT, 420 FPM FROM 98,000 POUNDS TO 124,200 POUNDS GROSS WEIGHT, OR 300 FPM WITH EXTERNAL FUEL AT ANY GROSS WEIGHT.

Figure 5 – 5 (Sheet 2 of 2)