Initial

SECRET

NAE SUMMARY OF ESTIMATED SUPERSONIC PERFORMANCE OF CF-105

The supersonic performance of the CF-105 aircraft has been calculated for the following conditions:

(a) Combat Weight = 48,134 lb.
(b) C.G. Position at 0.28 MAC
(c) Orenda thrust estimates for PS/13 engine as installed in CF-105 (in particular T = 18,400 lb. at M = 1.5 at 50,000 ft.)

The following is a summary of calculated performance under the above conditions.

(i) Normal steady load factor at M = 1.5 at 50,000 ft. = n = 1.38

(ii) Absolute ceiling (at M = 1.5) = 56,800 ft.

(iii) Maximum level Mach number at 50,000 ft. = 1.75

It should be pointed out that these calculations apply to a combat weight of 48,134 lb., which is the combat weight as estimated by Avro. Since the NAE estimate of drag is higher than the Avro estimate, the combat weight should also be somewhat higher because of the extra fuel required to complete a combat mission of 200 nautical miles radius. However, the calculation of mission fuel has not yet been made by the NAE.

The large difference between the above performance estimates and those submitted by Avro is due almost entirely to differences in the estimated values of two aerodynamic parameters. The first of these is $C_{D_{min}}$. The Avro estimate is 0.020 at M = 1.5, and the NAE estimate is 0.0233. The second parameter is C_{M_δ} at constant C_L, which is the elevator pitching moment effectiveness parameter. The Avro value at M = 1.5 is -0.00230, and the NAE value is -0.00188. This value was estimated by means of an extrapolation of the Cornell tunnel data to higher Mach numbers, and hence the difference in the two values of C_{M_δ} is due to differences in the method of extrapolation.

No estimate of the loss in steady turning performance has been made, due to probable future weight growth of the aircraft, because of the uncertainty in guessing the growth in combat weight. However, the load factor, n, will vary inversely with combat weight.

Regarding the question of weight reduction which would be necessary in order to raise the value of n from 1.38 to 2.0, it is easy to show that the required combat weight would be 33,200 lb. The total weight of the structure, power plant and flying control group is at present 32,000 lb. The remaining weight consists of fixed and removable equipment, crew, armament and other useful load including fuel.

RJT/FM

Initial

SECRET

NAE SUMMARY OF ESTIMATED SUPERSONIC PERFORMANCE OF CF-105

The supersonic performance of the CF-105 aircraft has been calculated for the following conditions:

(a) Combat Weight = 48,134 lb.
(b) C.G. Position at 0.28 MAC
(c) Orenda thrust estimates for PS/13 engine as installed in CF-105 (in particular T = 18,400 lb. at M = 1.5 at 50,000 ft.)

The following is a summary of calculated performance under the above conditions.

(i) Normal steady load factor at M = 1.5 at 50,000 ft. = n = 1.38

(ii) Absolute ceiling (at M = 1.5) = 56,800 ft.

(iii) Maximum level Mach number at 50,000 ft. = 1.75

It should be pointed out that these calculations apply to a combat weight of 48,134 lb., which is the combat weight as estimated by Avro. Since the NAE estimate of drag is higher than the Avro estimate, the combat weight should also be somewhat higher because of the extra fuel required to complete a combat mission of 200 nautical miles radius. However, the calculation of mission fuel has not yet been made by the NAE.

The large difference between the above performance estimates and those submitted by Avro is due almost entirely to differences in the estimated values of two aerodynamic parameters. The first of these is $C_{D_{min}}$. The Avro estimate is 0.020 at M = 1.5, and the NAE estimate is 0.0233. The second parameter is C_{M_δ} at constant C_L, which is the elevator pitching moment effectiveness parameter. The Avro value at M = 1.5 is -0.00230, and the NAE value is -0.00188. This value was estimated by means of an extrapolation of the Cornell tunnel data to higher Mach numbers, and hence the difference in the two values of C_{M_δ} is due to differences in the method of extrapolation.

No estimate of the loss in steady turning performance has been made, due to probable future weight growth of the aircraft, because of the uncertainty in guessing the growth in combat weight. However, the load factor, n, will vary inversely with combat weight.

Regarding the question of weight reduction which would be necessary in order to raise the value of n from 1.38 to 2.0, it is easy to show that the required combat weight would be 33,200 lb. The total weight of the structure, power plant and flying control group is at present 32,000 lb. The remaining weight consists of fixed and removable equipment, crew, armament and other useful load including fuel.

RJT/FM

Initial

SECRET

NAE SUMMARY OF ESTIMATED SUPERSONIC PERFORMANCE OF CF-105

The supersonic performance of the CF-105 aircraft has been calculated for the following conditions:

(a) Combat Weight = 48,134 lb.
(b) C.G. Position at 0.28 MAC
(c) Orenda thrust estimates for PS/13 engine as installed in CF-105 (in particular T = 18,400 lb. at M = 1.5 at 50,000 ft.)

The following is a summary of calculated performance under the above conditions.

(i) Normal steady load factor at M = 1.5 at 50,000 ft. = n = 1.38

(ii) Absolute ceiling (at M = 1.5) = 56,800 ft.

(iii) Maximum level Mach number at 50,000 ft. = 1.75

It should be pointed out that these calculations apply to a combat weight of 48,134 lb., which is the combat weight as estimated by Avro. Since the NAE estimate of drag is higher than the Avro estimate, the combat weight should also be somewhat higher because of the extra fuel required to complete a combat mission of 200 nautical miles radius. However, the calculation of mission fuel has not yet been made by the NAE.

The large difference between the above performance estimates and those submitted by Avro is due almost entirely to differences in the estimated values of two aerodynamic parameters. The first of these is $C_{D_{min}}$. The Avro estimate is 0.020 at M = 1.5, and the NAE estimate is 0.0233. The second parameter is C_{M_δ} at constant C_L, which is the elevator pitching moment effectiveness parameter. The Avro value at M = 1.5 is -0.00230, and the NAE value is -0.00188. This value was estimated by means of an extrapolation of the Cornell tunnel data to higher Mach numbers, and hence the difference in the two values of C_{M_δ} is due to differences in the method of extrapolation.

No estimate of the loss in steady turning performance has been made, due to probable future weight growth of the aircraft, because of the uncertainty in guessing the growth in combat weight. However, the load factor, n, will vary inversely with combat weight.

Regarding the question of weight reduction which would be necessary in order to raise the value of n from 1.38 to 2.0, it is easy to show that the required combat weight would be 33,200 lb. The total weight of the structure, power plant and flying control group is at present 32,000 lb. The remaining weight consists of fixed and removable equipment, crew, armament and other useful load including fuel.

RJT/FM

Initial

SECRET

NAE SUMMARY OF ESTIMATED SUPERSONIC PERFORMANCE OF CF-105

The supersonic performance of the CF-105 aircraft has been calculated for the following conditions:

(a) Combat Weight = 48,134 lb.
(b) C.G. Position at 0.28 MAC
(c) Orenda thrust estimates for PS/13 engine as installed in CF-105 (in particular T = 18,400 lb. at M = 1.5 at 50,000 ft.)

The following is a summary of calculated performance under the above conditions.

(i) Normal steady load factor at M = 1.5 at 50,000 ft. = n = 1.38

(ii) Absolute ceiling (at M = 1.5) = 56,800 ft.

(iii) Maximum level Mach number at 50,000 ft. = 1.75

It should be pointed out that these calculations apply to a combat weight of 48,134 lb., which is the combat weight as estimated by Avro. Since the NAE estimate of drag is higher than the Avro estimate, the combat weight should also be somewhat higher because of the extra fuel required to complete a combat mission of 200 nautical miles radius. However, the calculation of mission fuel has not yet been made by the NAE.

The large difference between the above performance estimates and those submitted by Avro is due almost entirely to differences in the estimated values of two aerodynamic parameters. The first of these is $C_{D_{min}}$. The Avro estimate is 0.020 at M = 1.5, and the NAE estimate is 0.0233. The second parameter is C_{M_δ} at constant C_L, which is the elevator pitching moment effectiveness parameter. The Avro value at M = 1.5 is -0.00230, and the NAE value is -0.00188. This value was estimated by means of an extrapolation of the Cornell tunnel data to higher Mach numbers, and hence the difference in the two values of C_{M_δ} is due to differences in the method of extrapolation.

No estimate of the loss in steady turning performance has been made, due to probable future weight growth of the aircraft, because of the uncertainty in guessing the growth in combat weight. However, the load factor, n, will vary inversely with combat weight.

Regarding the question of weight reduction which would be necessary in order to raise the value of n from 1.38 to 2.0, it is easy to show that the required combat weight would be 33,200 lb. The total weight of the structure, power plant and flying control group is at present 32,000 lb. The remaining weight consists of fixed and removable equipment, crew, armament and other useful load including fuel.

RJT/FM

Initial

SECRET

NAE SUMMARY OF ESTIMATED SUPERSONIC PERFORMANCE OF CF-105

The supersonic performance of the CF-105 aircraft has been calculated for the following conditions:

(a) Combat Weight = 48,134 lb.
(b) C.G. Position at 0.28 MAC
(c) Orenda thrust estimates for PS/13 engine as installed in CF-105 (in particular T = 18,400 lb. at M = 1.5 at 50,000 ft.)

The following is a summary of calculated performance under the above conditions.

(i) Normal steady load factor at M = 1.5 at 50,000 ft. = n = 1.38

(ii) Absolute ceiling (at M = 1.5) = 56,800 ft.

(iii) Maximum level Mach number at 50,000 ft. = 1.75

It should be pointed out that these calculations apply to a combat weight of 48,134 lb., which is the combat weight as estimated by Avro. Since the NAE estimate of drag is higher than the Avro estimate, the combat weight should also be somewhat higher because of the extra fuel required to complete a combat mission of 200 nautical miles radius. However, the calculation of mission fuel has not yet been made by the NAE.

The large difference between the above performance estimates and those submitted by Avro is due almost entirely to differences in the estimated values of two aerodynamic parameters. The first of these is $C_{D_{min}}$. The Avro estimate is 0.020 at M = 1.5, and the NAE estimate is 0.0233. The second parameter is C_{M_δ} at constant C_L, which is the elevator pitching moment effectiveness parameter. The Avro value at M = 1.5 is -0.00230, and the NAE value is -0.00188. This value was estimated by means of an extrapolation of the Cornell tunnel data to higher Mach numbers, and hence the difference in the two values of C_{M_δ} is due to differences in the method of extrapolation.

No estimate of the loss in steady turning performance has been made, due to probable future weight growth of the aircraft, because of the uncertainty in guessing the growth in combat weight. However, the load factor, n, will vary inversely with combat weight.

Regarding the question of weight reduction which would be necessary in order to raise the value of n from 1.38 to 2.0, it is easy to show that the required combat weight would be 33,200 lb. The total weight of the structure, power plant and flying control group is at present 32,000 lb. The remaining weight consists of fixed and removable equipment, crew, armament and other useful load including fuel.

RJT/FM

Initial

SECRET

NAE SUMMARY OF ESTIMATED SUPERSONIC PERFORMANCE OF CF-105

The supersonic performance of the CF-105 aircraft has been calculated for the following conditions:

(a) Combat Weight = 48,134 lb.
(b) C.G. Position at 0.28 MAC
(c) Orenda thrust estimates for PS/13 engine as installed in CF-105 (in particular T = 18,400 lb. at M = 1.5 at 50,000 ft.)

The following is a summary of calculated performance under the above conditions.

(i) Normal steady load factor at M = 1.5 at 50,000 ft. = n = 1.38

(ii) Absolute ceiling (at M = 1.5) = 56,800 ft.

(iii) Maximum level Mach number at 50,000 ft. = 1.75

It should be pointed out that these calculations apply to a combat weight of 48,134 lb., which is the combat weight as estimated by Avro. Since the NAE estimate of drag is higher than the Avro estimate, the combat weight should also be somewhat higher because of the extra fuel required to complete a combat mission of 200 nautical miles radius. However, the calculation of mission fuel has not yet been made by the NAE.

The large difference between the above performance estimates and those submitted by Avro is due almost entirely to differences in the estimated values of two aerodynamic parameters. The first of these is $C_{D_{min}}$. The Avro estimate is 0.020 at M = 1.5, and the NAE estimate is 0.0233. The second parameter is C_{M_δ} at constant C_L, which is the elevator pitching moment effectiveness parameter. The Avro value at M = 1.5 is -0.00230, and the NAE value is -0.00188. This value was estimated by means of an extrapolation of the Cornell tunnel data to higher Mach numbers, and hence the difference in the two values of C_{M_δ} is due to differences in the method of extrapolation.

No estimate of the loss in steady turning performance has been made, due to probable future weight growth of the aircraft, because of the uncertainty in guessing the growth in combat weight. However, the load factor, n, will vary inversely with combat weight.

Regarding the question of weight reduction which would be necessary in order to raise the value of n from 1.38 to 2.0, it is easy to show that the required combat weight would be 33,200 lb. The total weight of the structure, power plant and flying control group is at present 32,000 lb. The remaining weight consists of fixed and removable equipment, crew, armament and other useful load including fuel.

RJT/FM