

on local  
[signature]

Classification cancelled / Changed to UNCLAS  
By authority of DRDA  
Date 10 Dec 54  
Signature [signature]  
Unit / Rank / Appointment DRDA-7

PROJECT "Y"

A Theoretical and Preliminary Numerical Study of Stability and Control

RESTRICED BY [signature]  
Date 16-12-54

Boulfield

|                                           |                    |
|-------------------------------------------|--------------------|
| DEFENCE SCIENTIFIC INFORMATION<br>SERVICE |                    |
| DEFENCE RESEARCH BOARD                    |                    |
| Date :                                    | <b>DEC 10 1954</b> |
| From :                                    |                    |
| Copy No. :                                | <u>1 of 1</u>      |
| ACC. No. :                                | <b>54/15312</b>    |

Declassed & release  
[signature]  
25 Oct 84

**UNCLASSIFIED**  
**UNSECRET**

A. V. Roe Canada Limited  
Malton, Ont.  
January 8, 1953.

PROJECT Y

Fig 1

ESTIMATED RESPONSE OF AIRCRAFT TO

SMALL CONTROL SURFACE DEFLECTIONS

ENGINE OFF (NOT OPERATING)

 $M=2.0$ 

ALT = 50,000 ft

STATED MARGIN  $\pm 10$  OF MEAN AIRCRAFT (STABLE)(a) RESPONSE TO APPLIED  
PITCHING MOMENTANGLE  
(deg)Mom  
(ft-lb)

APPLIED PITCHING MOMENT

10  
5  
010,000  
5,000  
0

TIME (SECONDS)

PITCH

ANGLE  
(deg)Mom  
(ft-lb)

APPLIED PITCHING MOMENT

10  
5  
010,000  
5,000  
0

TIME (SECONDS)

PITCH

(b) RESPONSE TO APPLIED  
ROLLING MOMENT

ROLLING MOMENT

PROJECT

ESTIMATED RESPONSE OF AIRCRAFT TOSMALL CONTROL SURFACE DEFLECTIONS

M=2.0

ALT = 30,000 FT

STATIC MARGIN = 5% OF MEAN CHORD (STATIC)

ANGLE MOM  
(DEG) (FT US)

10 REAR

5 5000

(a) RESPONSE TO APPLIED  
PITCHING MOMENTAPPLIED PITCHING  
MOMENTANGLE  
ON PITCH

ANGLE OF ROLL

ANGLE  
ROLLANGLE OF  
ROLL5 Mom  
(F US)

2 10,000

(b) RESPONSE TO APPLIED  
ROLLING MOMENTAPPLIED ROLLING  
MOMENT

5000

ANGLE OF  
ROLL

TIME (SECONDS)

FIG. 3.

## PROJECT Y

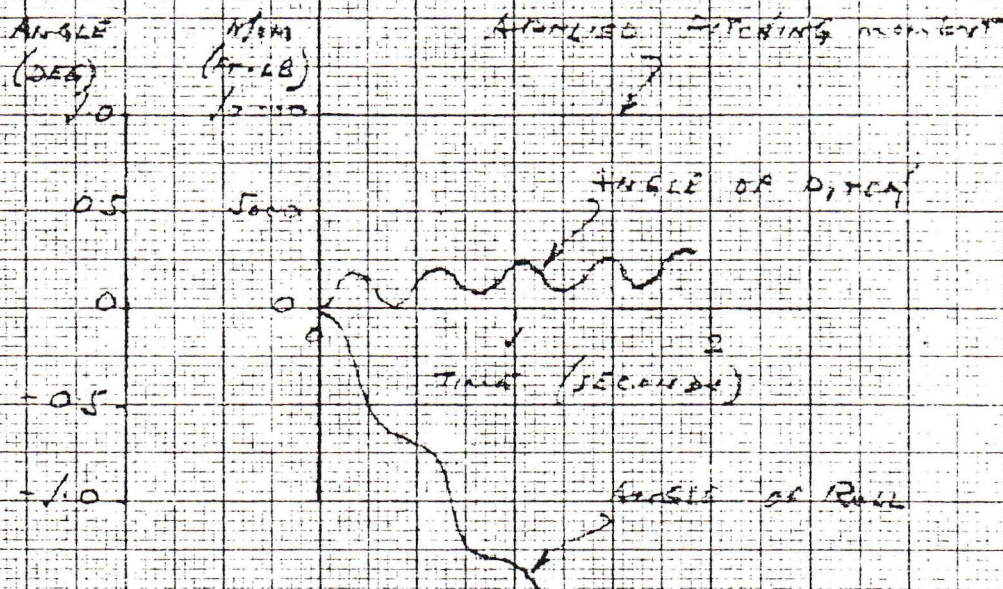
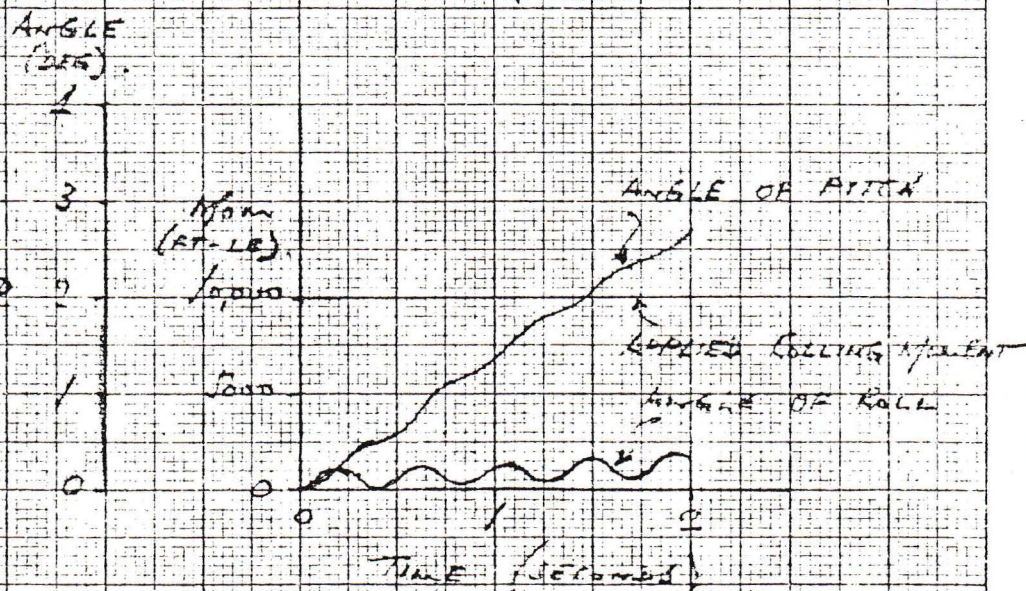
ESTIMATED RESPONSE OF AIRCRAFT TO  
SMALL CONTROL SURFACE DEFLECTIONS.

ENGINE ON (800 RPM)

 $M = 2.0$ 

ALT = 50,000 FT.

STATIC MARGIN = 0

a) RESPONSE TO APPLIED  
PITCHING MOMENTb) RESPONSE TO APPLIED  
ROLLING MOMENT

PROJECT Y

FIG 4

ESTIMATED RESPONSE OF AIRCRAFT TO  
SMALL CONTROL SURFACE DEFLECTIONS

ENGINE ON (800 RPM)

 $M = 0.5$ 

ALT = 36,000 FT.

STATIC MARGIN = 20% OF MEAN CHORD (UNSTABLE)

ANGLE IN DEG.

(DEG) (FT-40)

10 10000

APPLIED DISTURBING MOMENT

?

2) RESPONSE TO APPLIED  
PITCHING MOMENT

0.5 5000

0

0

TIME (SECONDS)

ANGLE OF PITCH

ANGLE OF ROLL

ANGLE IN DEG.

(DEG) (FT-40)

0 10000

1

5000

ANGLE OF PITCH

APPLIED ROLLING MOMENT

TIME (SECONDS)

ANGLE OF ROLL

1) RESPONSE TO APPLIED  
ROLLING MOMENT

-1

-2

-3

-4