CRANFIELD INSTITUTE OF TECHNOLOGY

SCHOOL OF MECHANICAL ENGINEERING

TOTAL TECHNOLOGY PhD THESIS

CHRISTOPHER J ROBINSON

End-Wall Flows and Blading Design For Axial Flow Compressors

VOLUME II

Supervisor: Dr A B McKenzie

May 1991

This thesis is submitted in partial submission
for the degree of Doctor of Philosophy

INTERNATIONAL

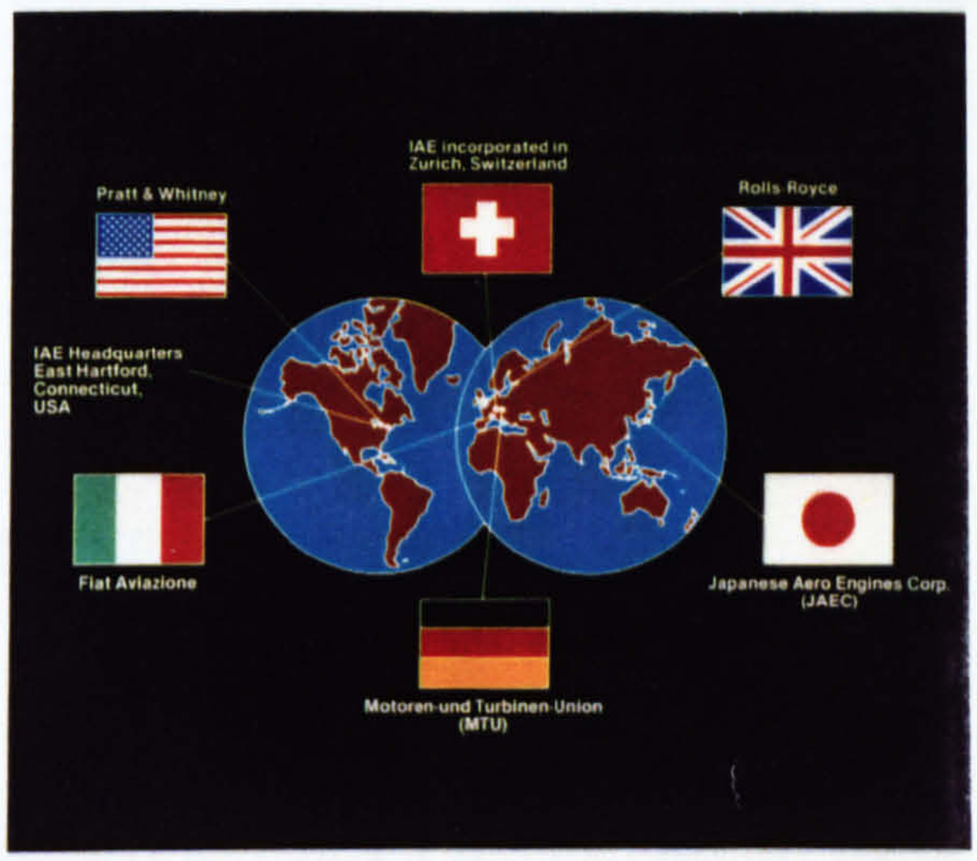
V2500

AERO ◆ ENGINES

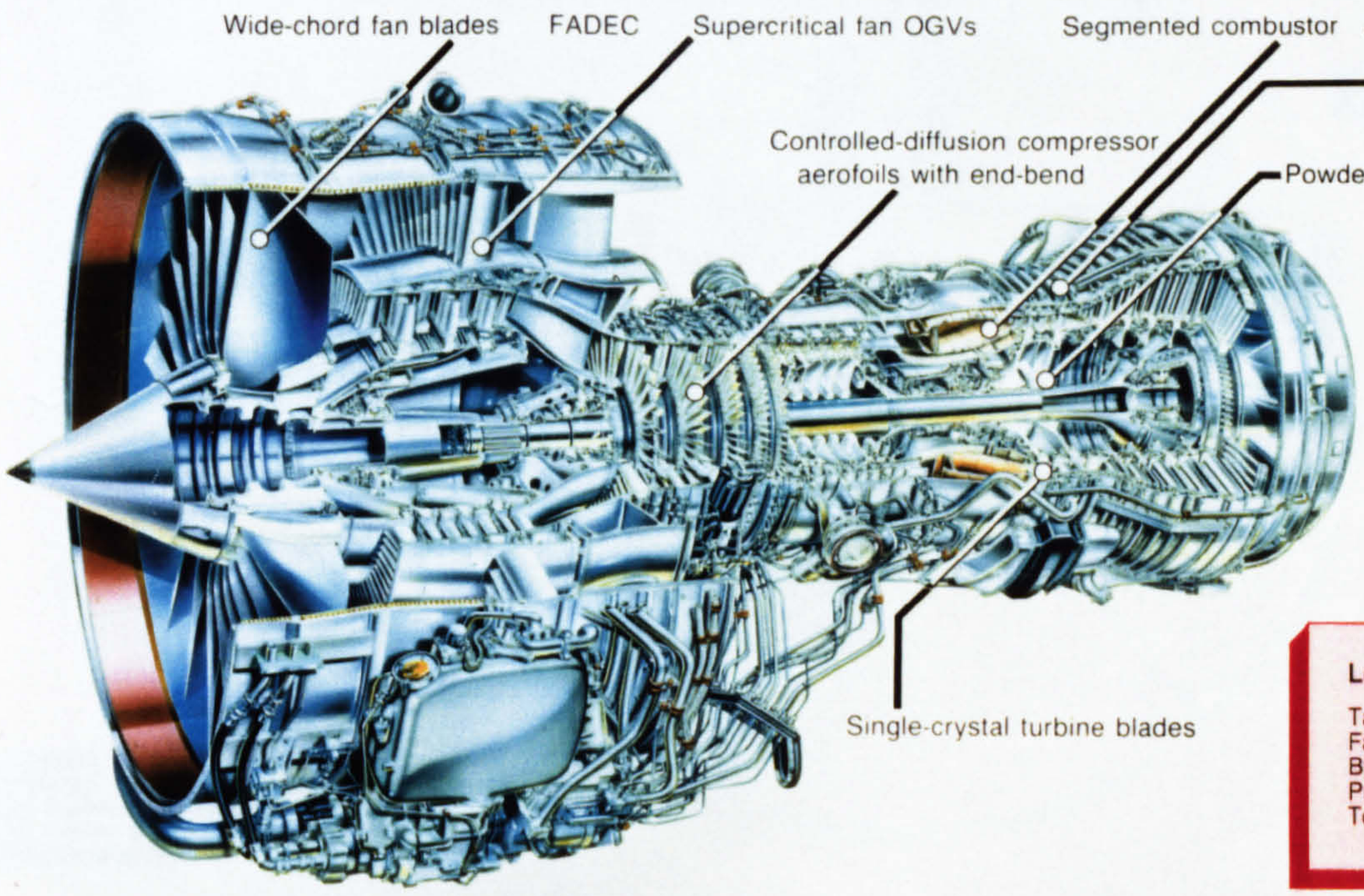
World's widest engine collaboration

Global collaboration

- Combines the technological expertise and resources of five leading aero-engine companies to provide:
  - — excellent integrity & reliability
  - — low fuel consumption
  - — low noise
  - — ease of maintenance
  - — good resistance to ingestion damage
  - — growth potential
- Selected to power Airbus A320
- Service entry 1989



Advanced technology features



Leading particulars

Take-off thrust	25 000 lb (11 340 kg)
Fan diameter	63 in (1600 mm)
Bypass ratio	5.7
Pressure ratio	30.2
Total air flow	790 lb/s (358 kg/s)

Fig 1.1 **Leaner, cleaner, power**

CYCLE AND COMPONENT IMPACT ON ENGINE PERFORMANCE

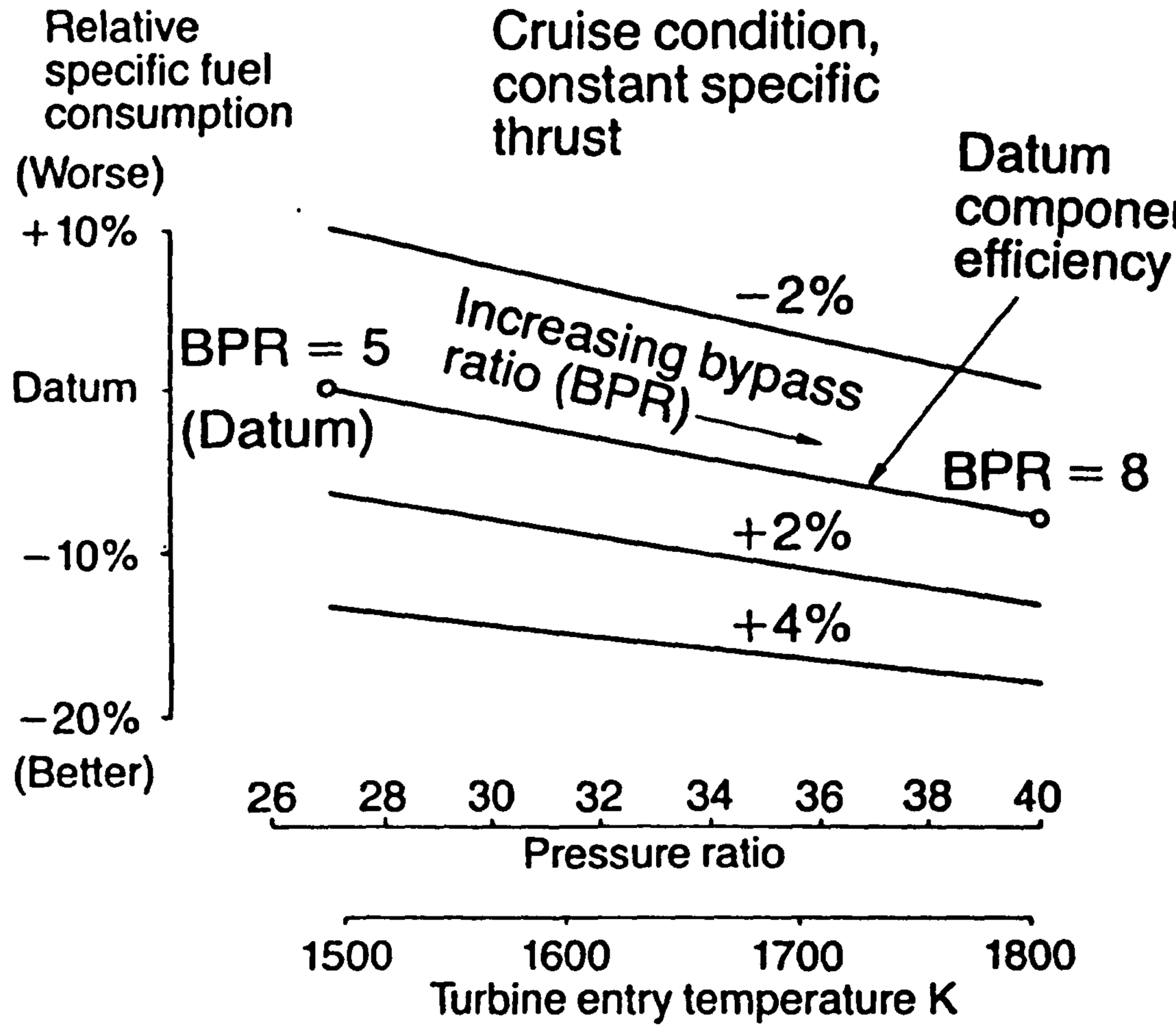


Fig 1.2

World aerospace market 1988-2010

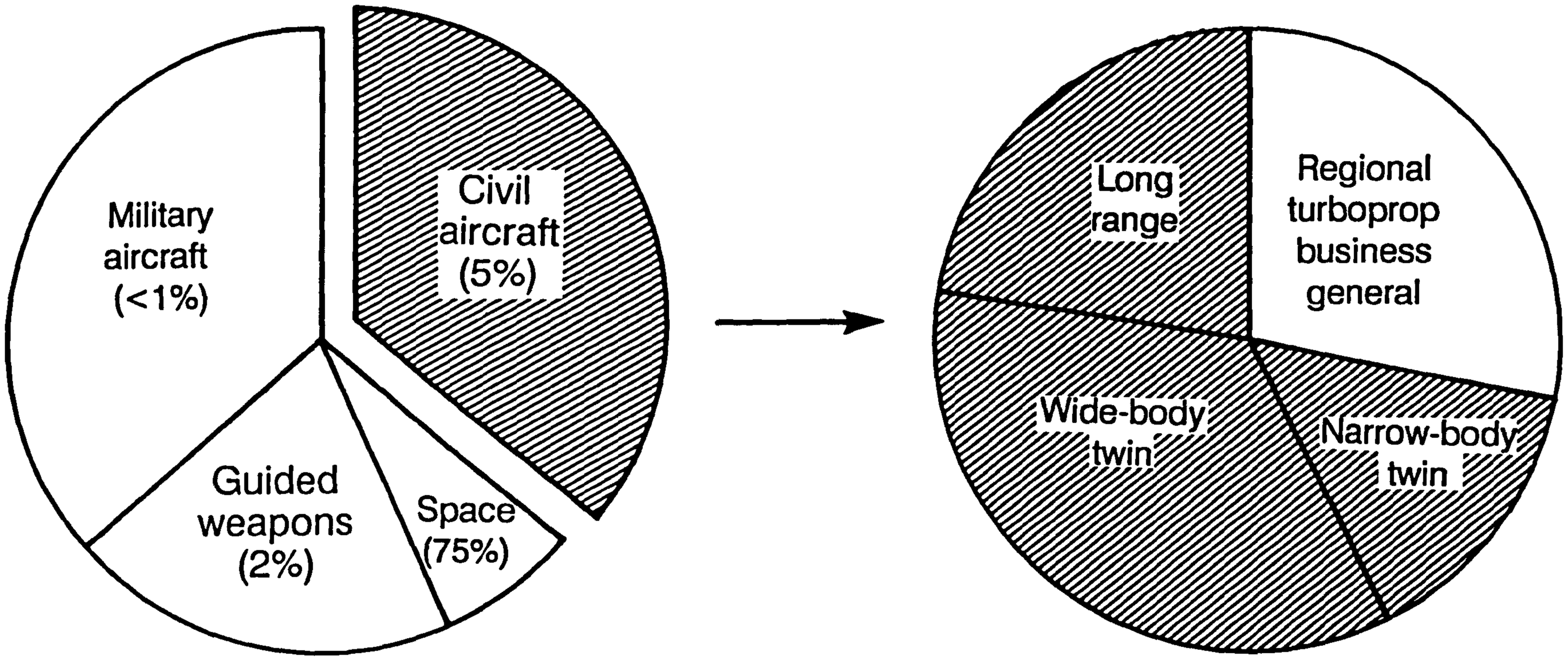
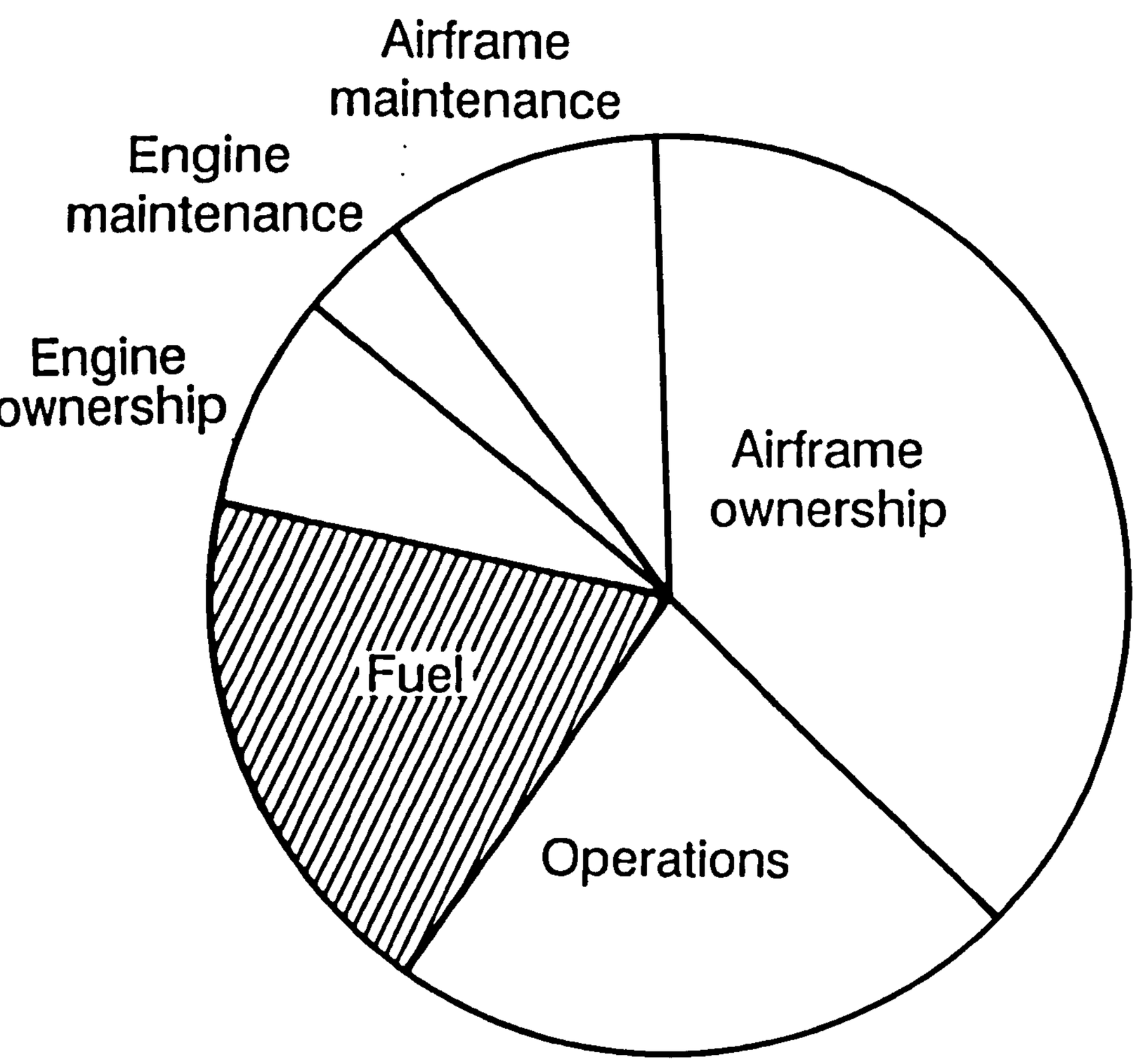


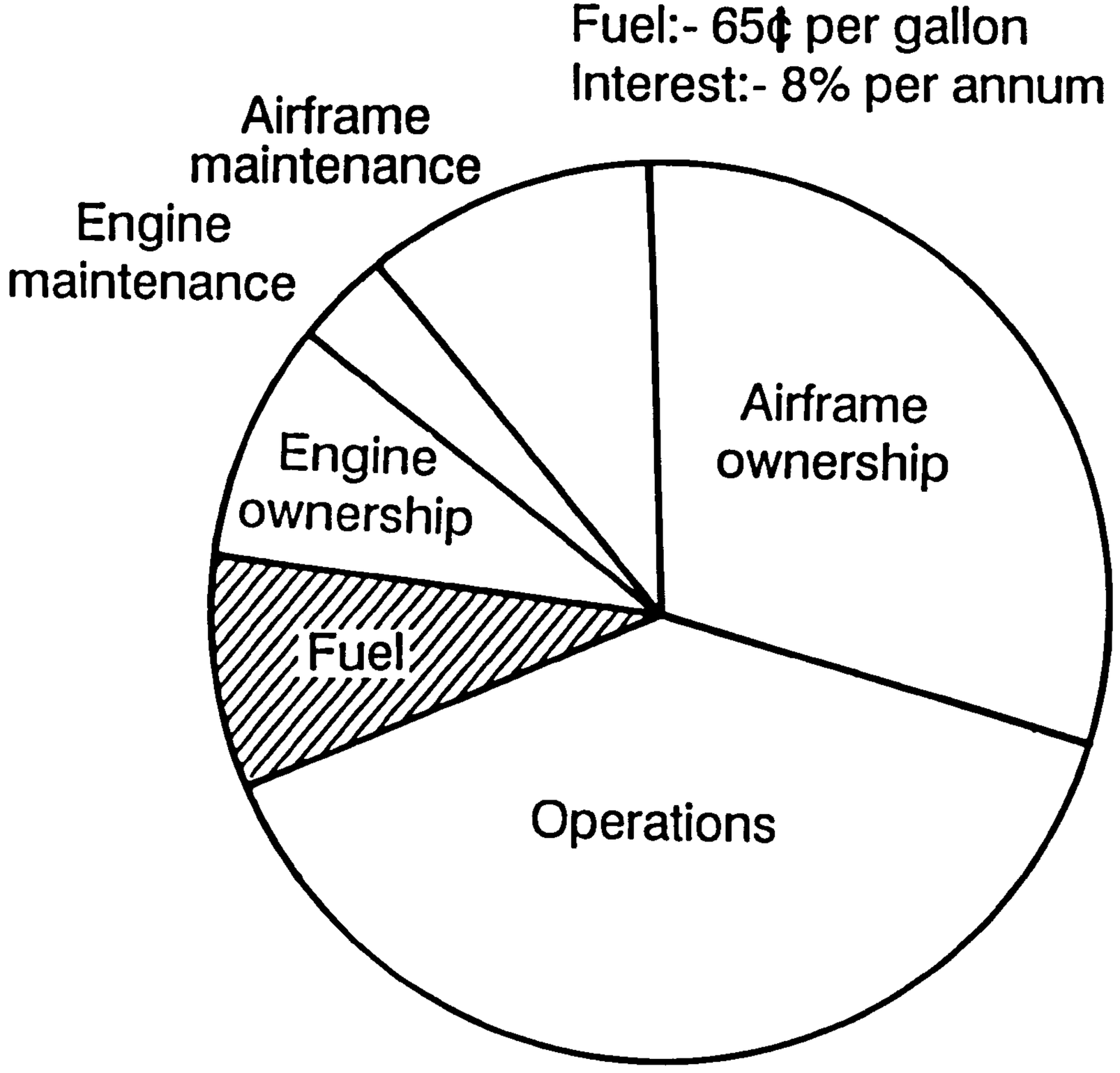
Fig 2.1 **Total value @ 1987 prices $2080 billion**

VML59998

Long haul - short haul direct operating cost comparison
Proportion of costs per block hour



Fuel:- 65¢ per gallon
Interest:- 8% per annum



Aircraft	Boeing 747	Airbus A320
Engine	RB211 (x4)	IAE V2500 (x2)
Stage length	3000 Nmi	500 Nmi
Passengers	400	150
Cost per seat mile	5.3¢	10.2¢

Fig 2.2

VML59993

US jet kerosene prices 1986

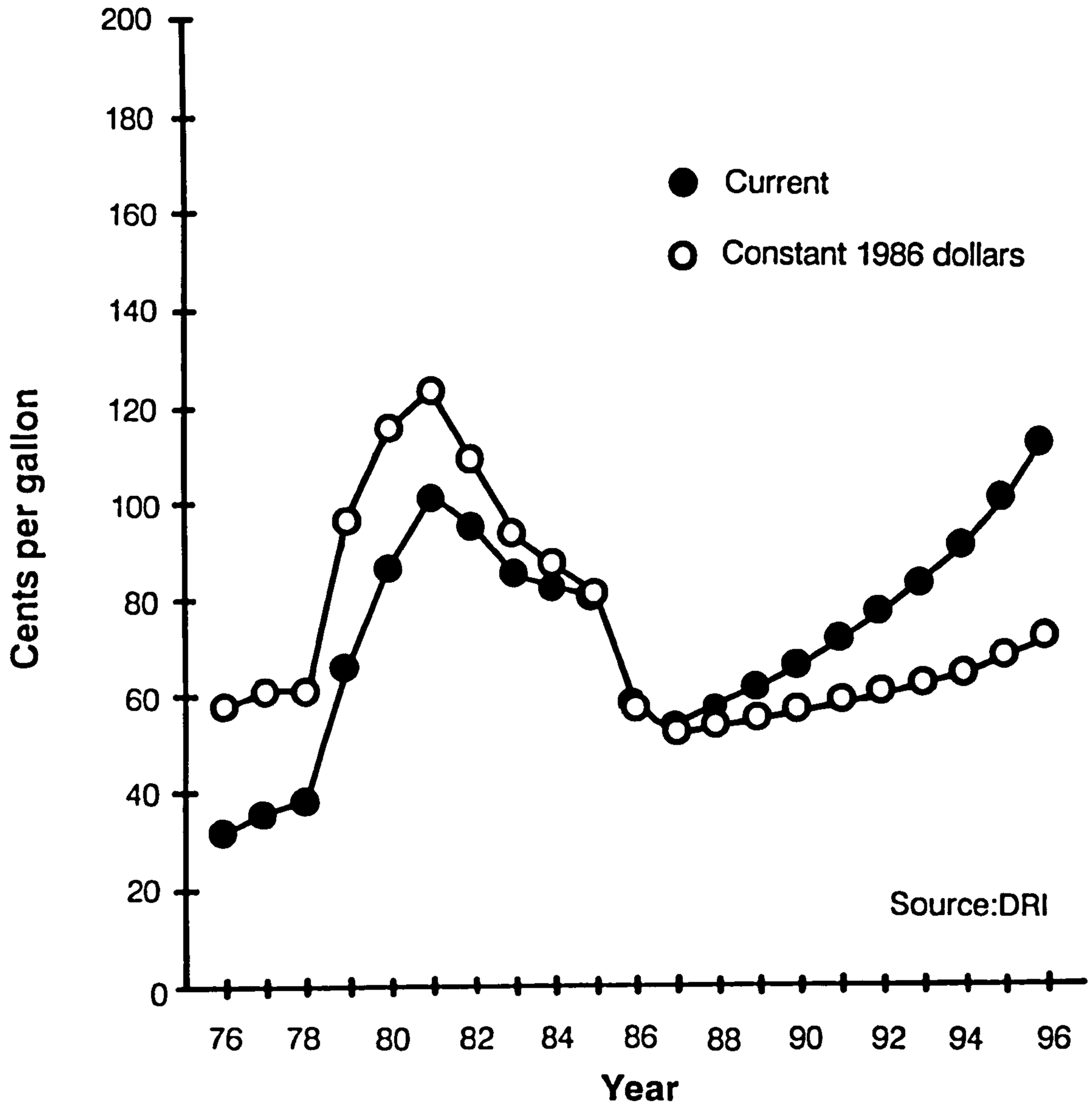


Fig 2.3

VML59994

SFC as a function of η tn + η prop

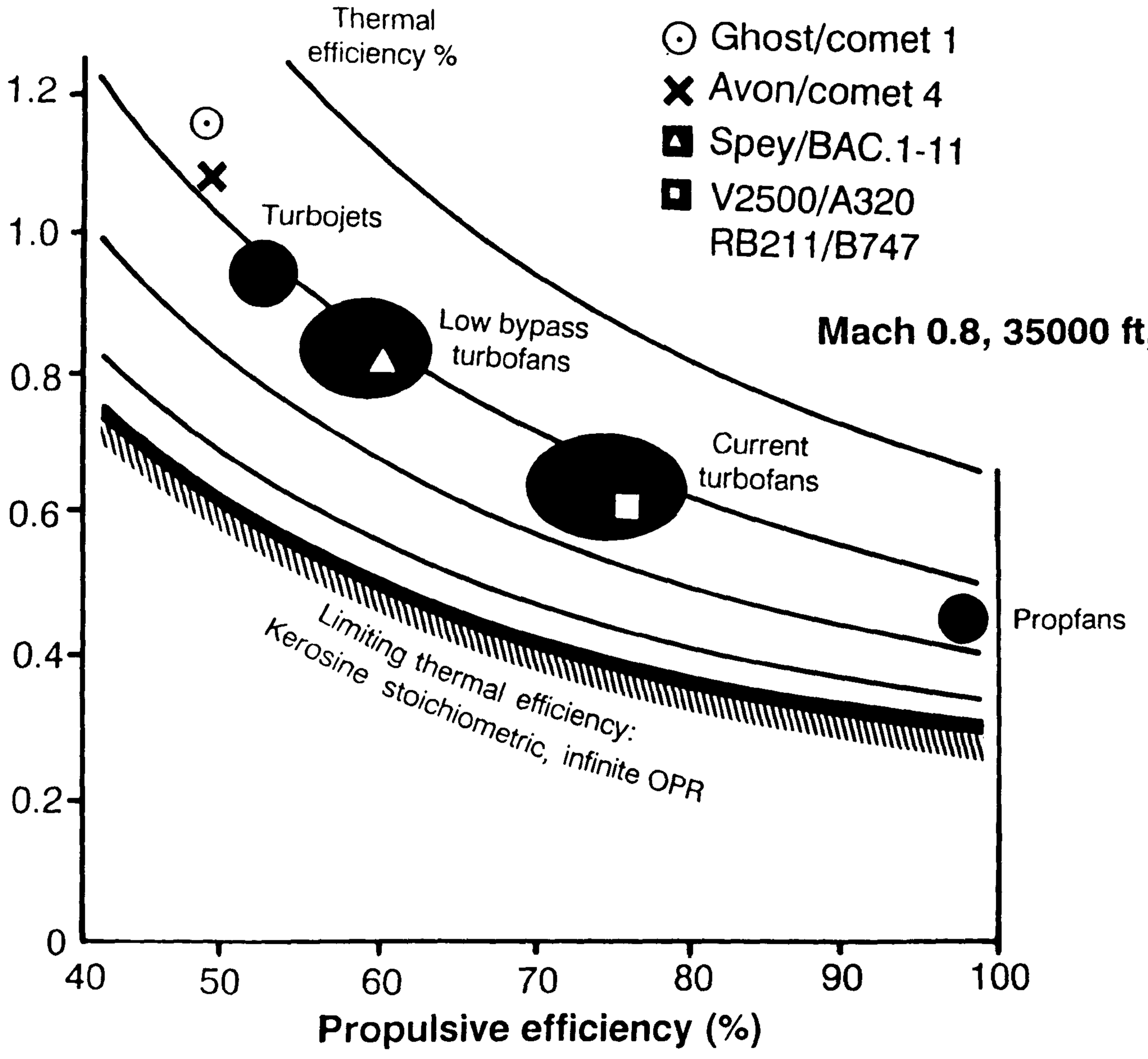


Fig 2.4

VML99995

Influence of component η on thermal η

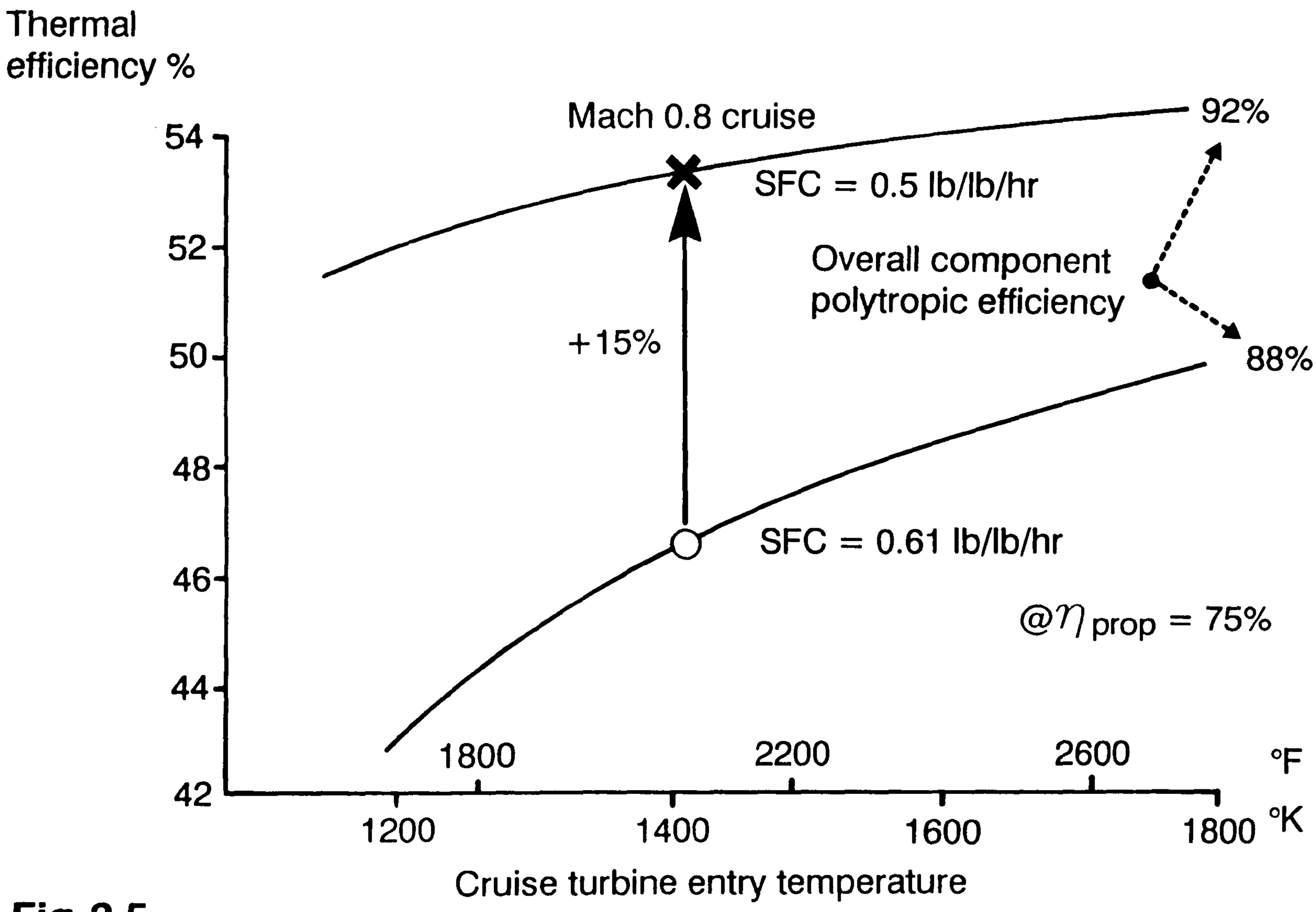
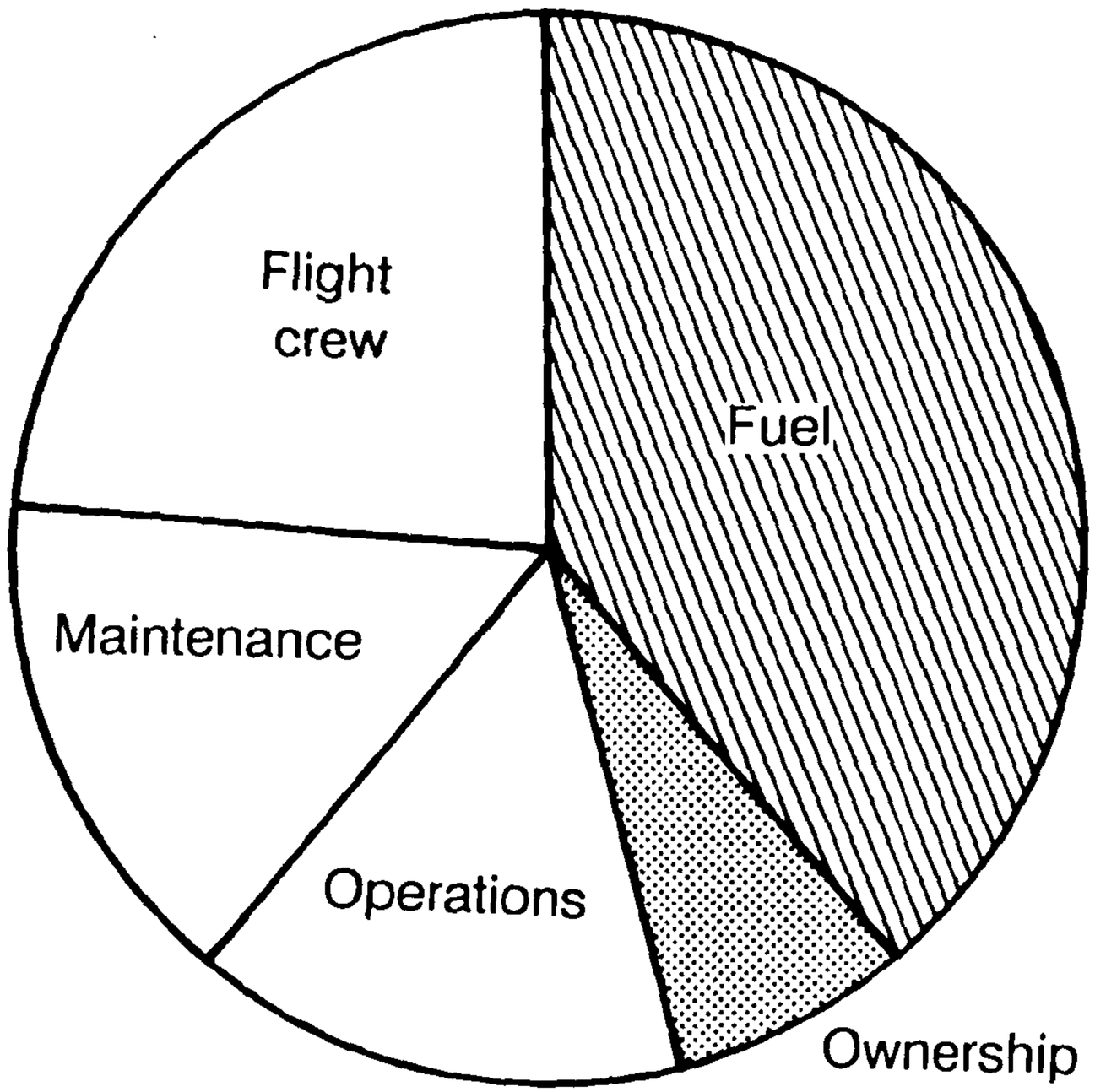


Fig 2.5

VML59987

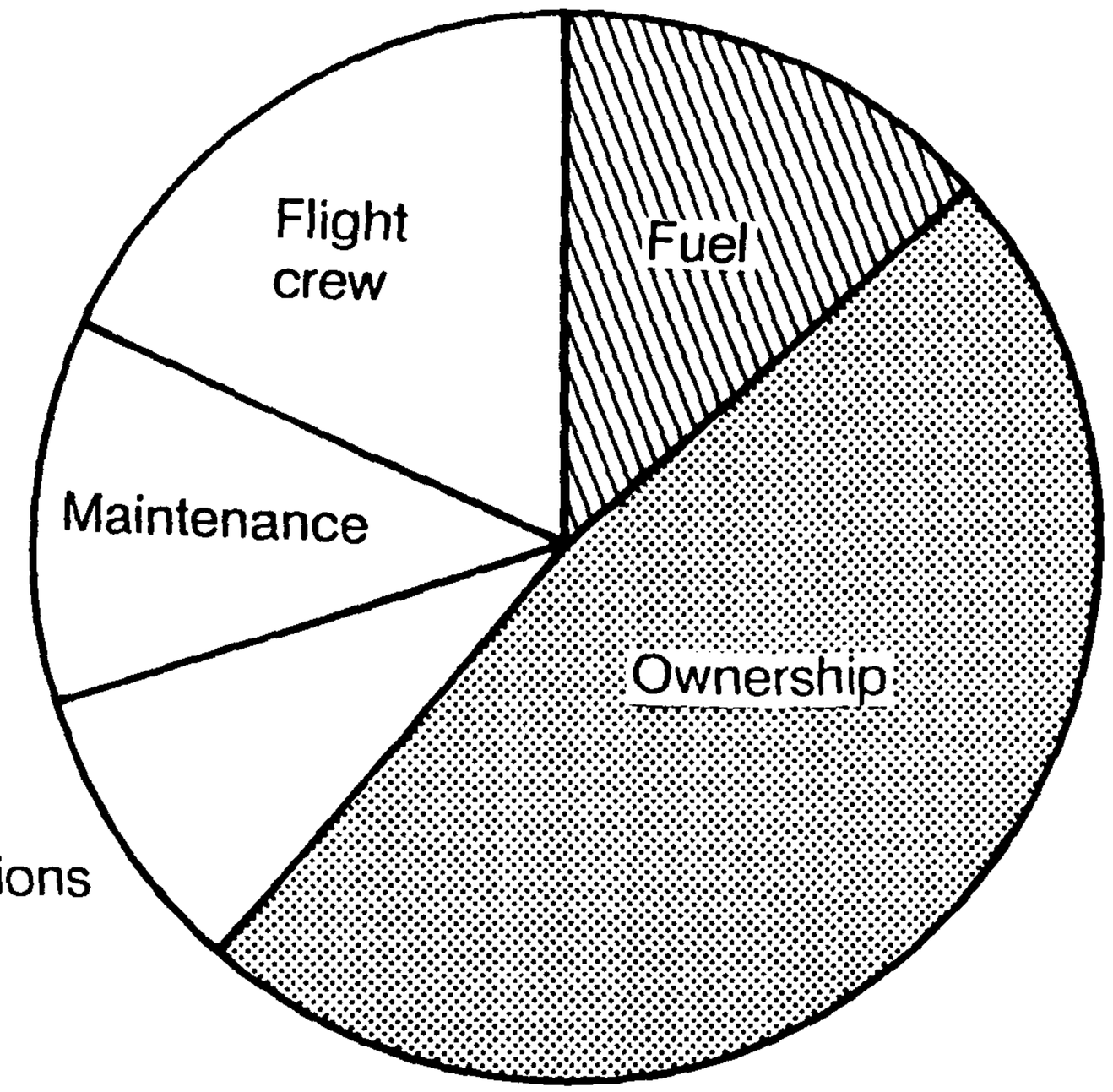
Low-tech/high-tech direct operating cost comparison

Boeing 727-200
P & W JT8-D



Total $/Block hr **$2143**

Boeing 7J7
GE36 UDF



$2377

Fig 2.6

FUEL 65¢/gal INTEREST 7.5% p.a.

VML59996

'S' curve of sales dependence on technology

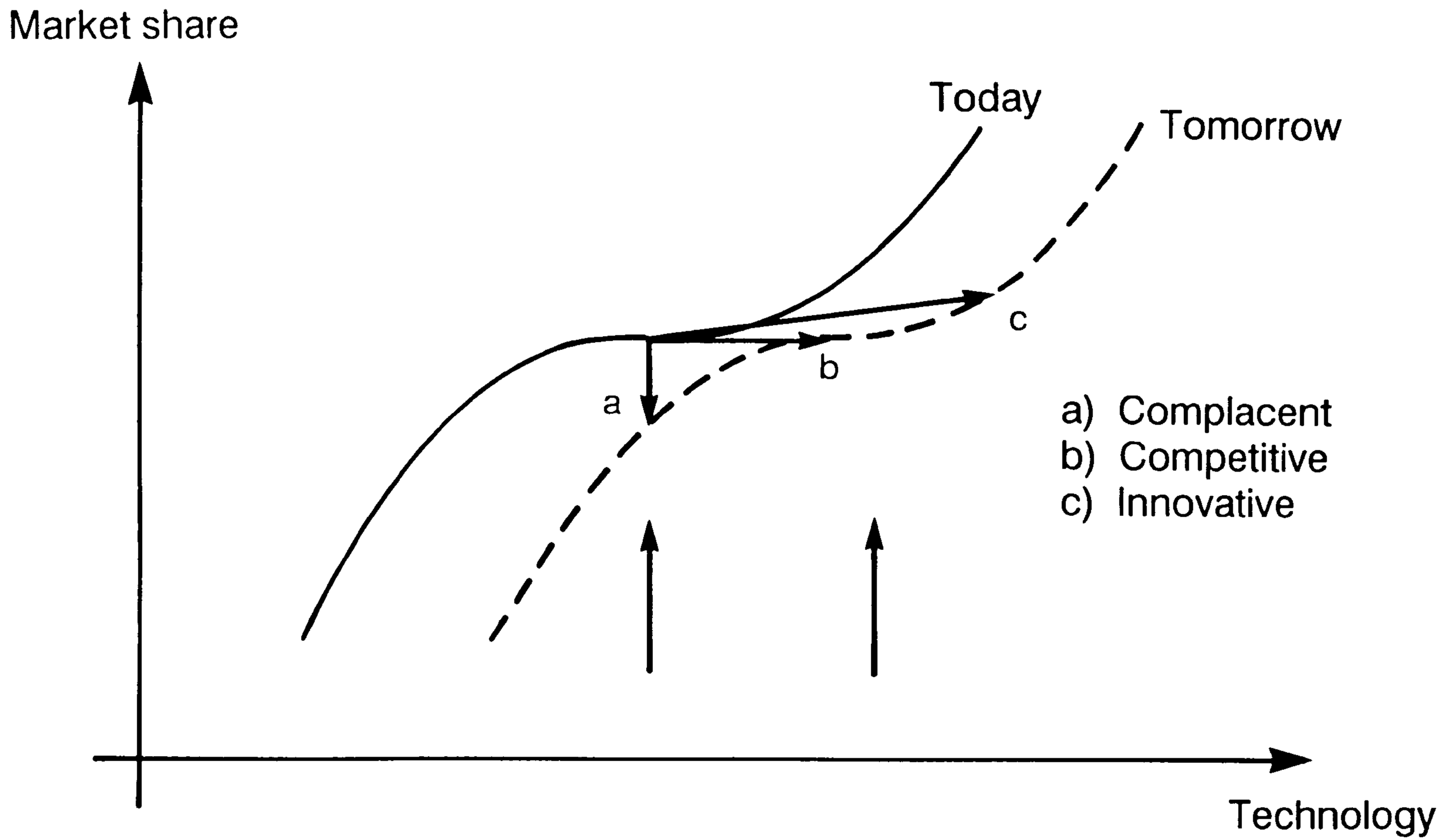


Fig 2.7

VML60008

Payload - Range diagram

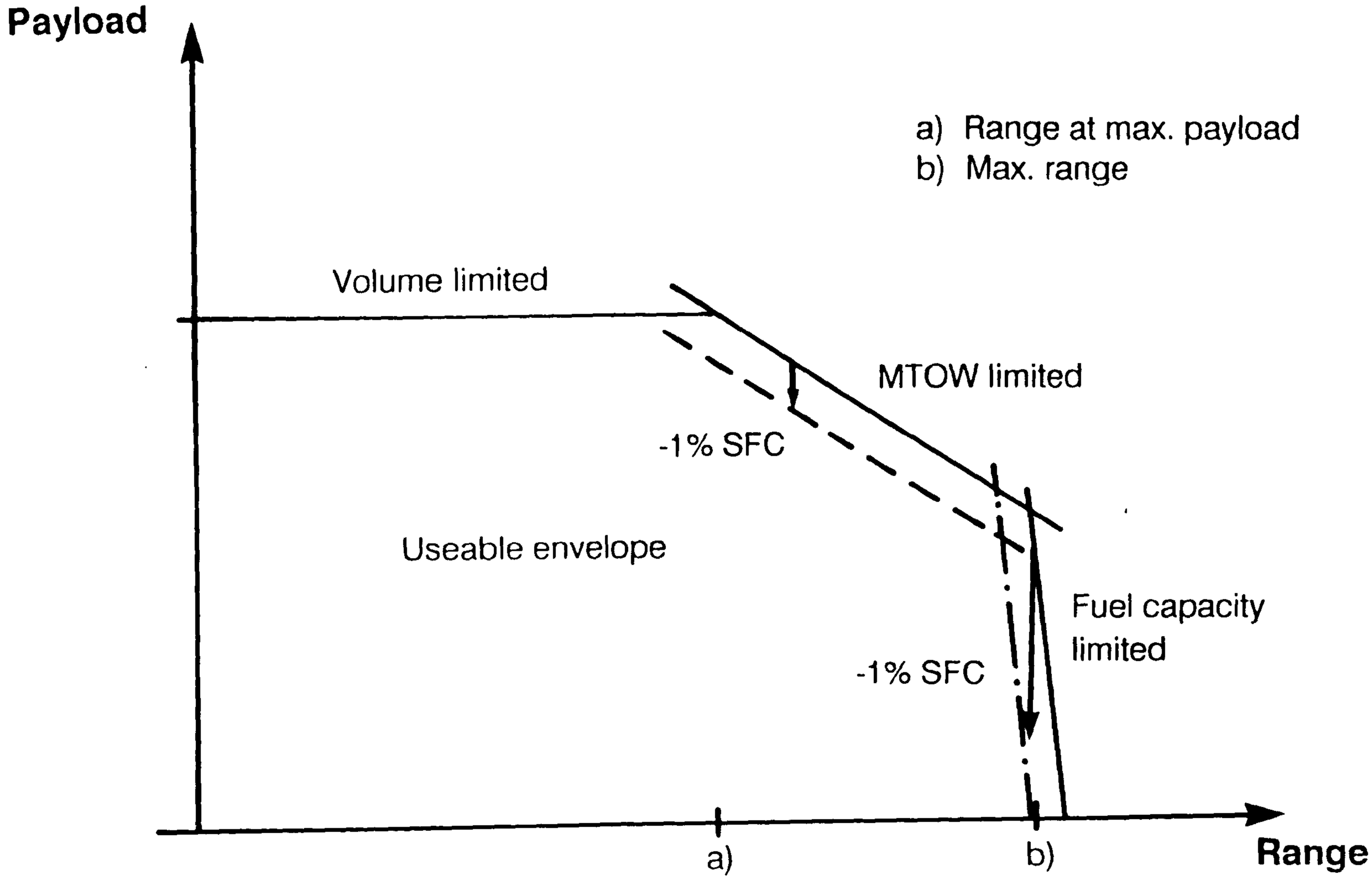


Fig 2.8

VML59997

Technological life-cycle

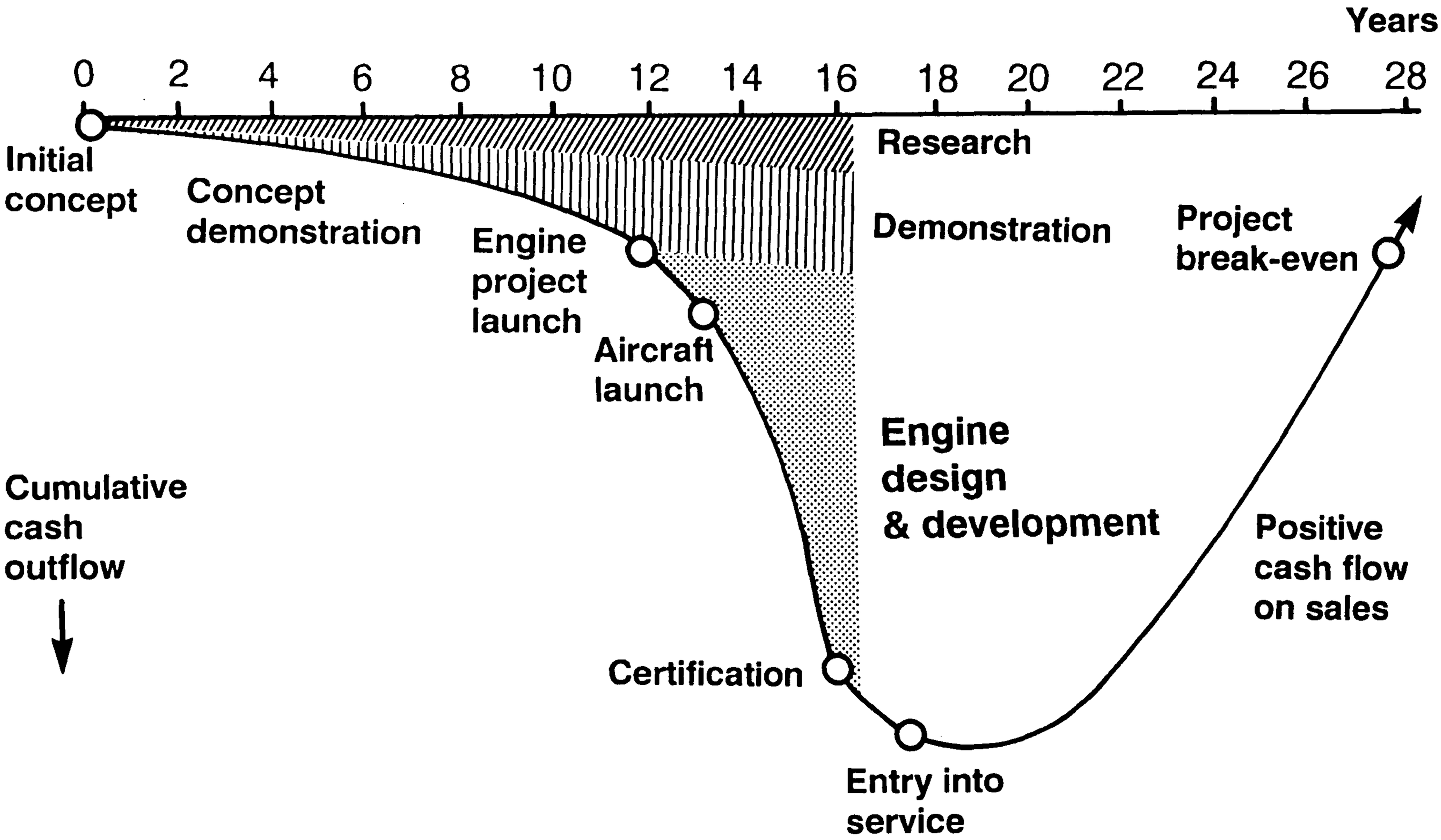


Fig 2.9

VML59992

Project cashflow - technology benefit

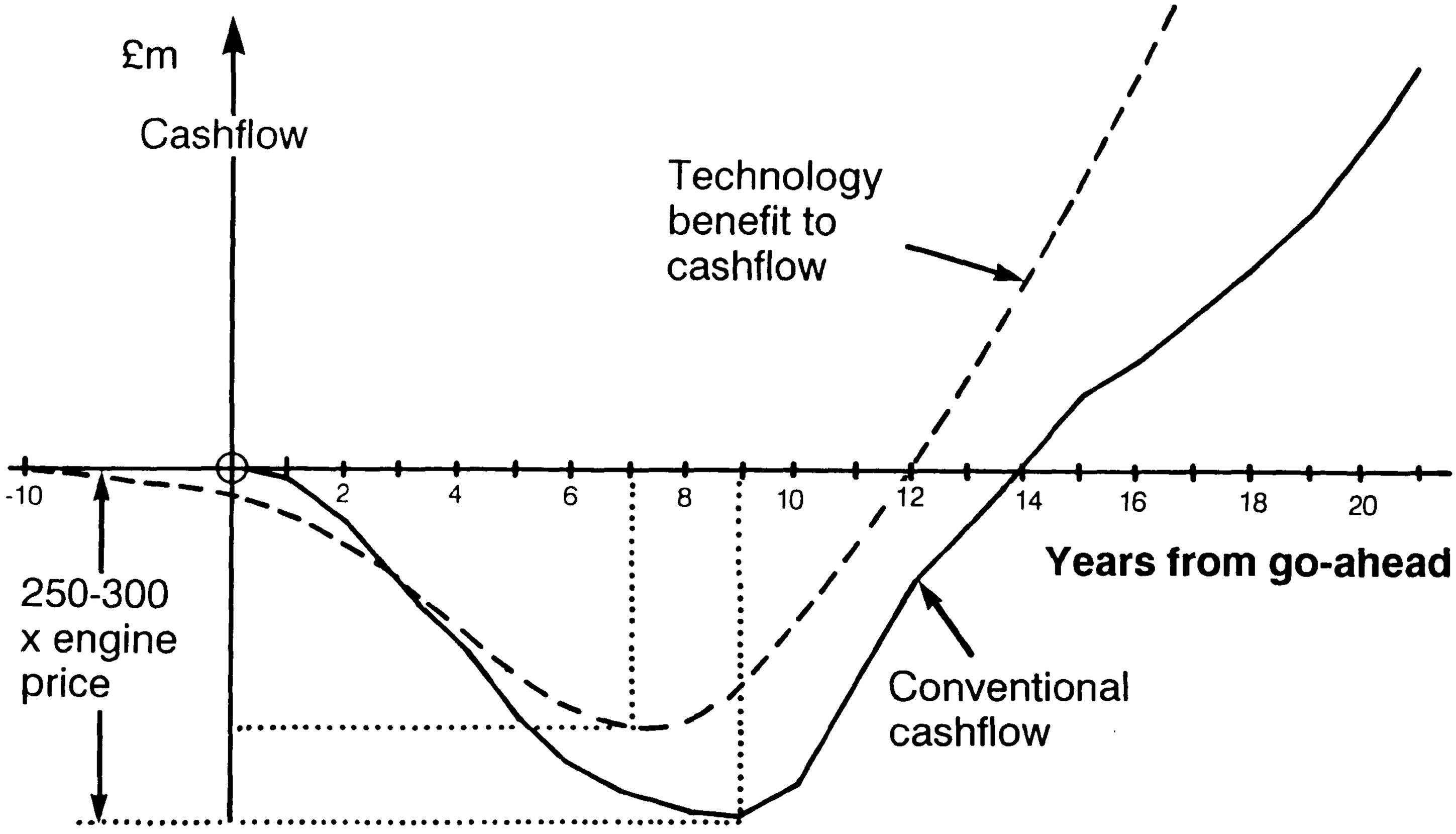


Fig 2.10

VML59958

Aero engine R & D costs : Analysis of 1970's programmes

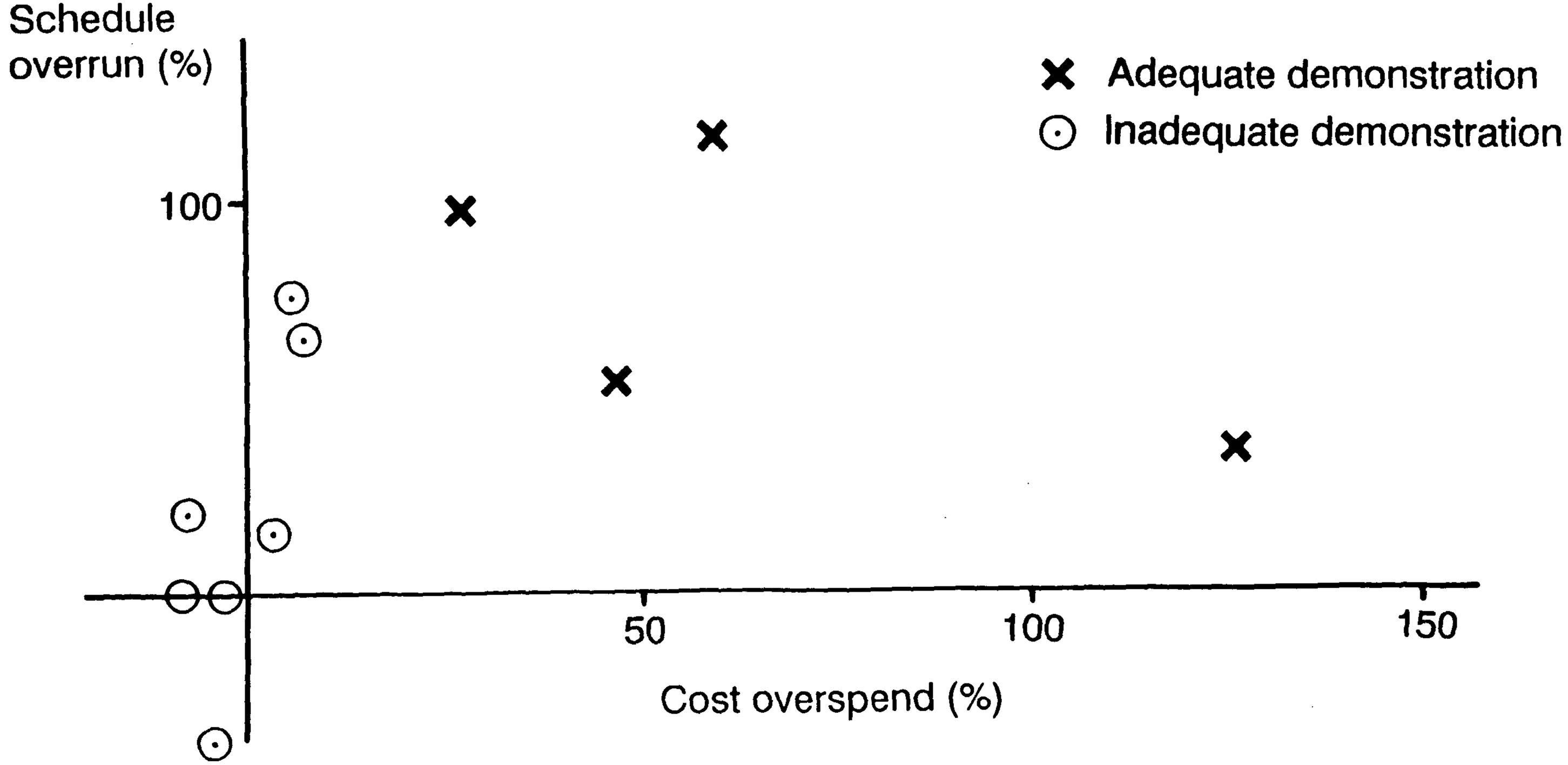


Fig 2.11

VML59989

The 'S' curve of technical progress

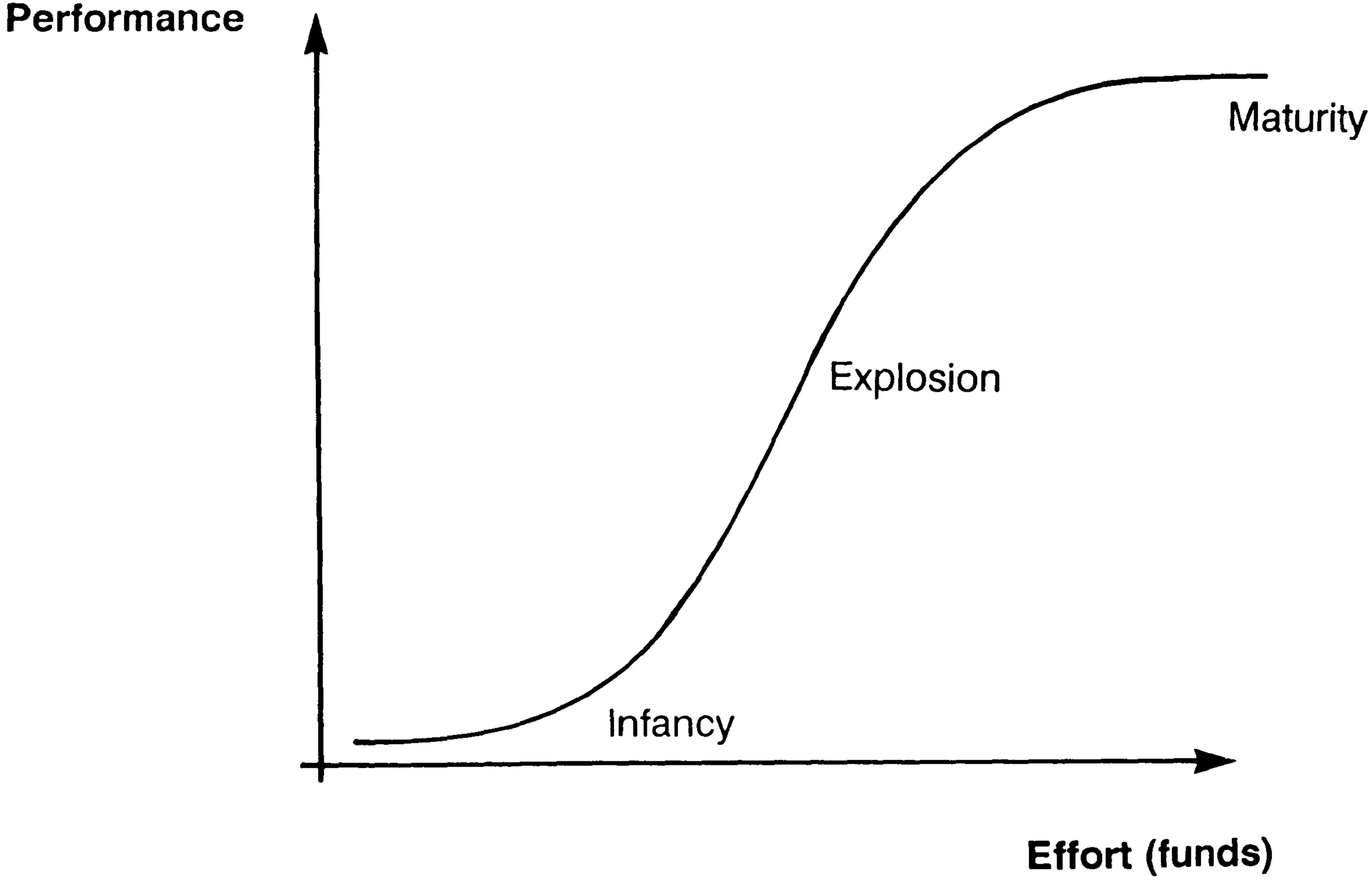
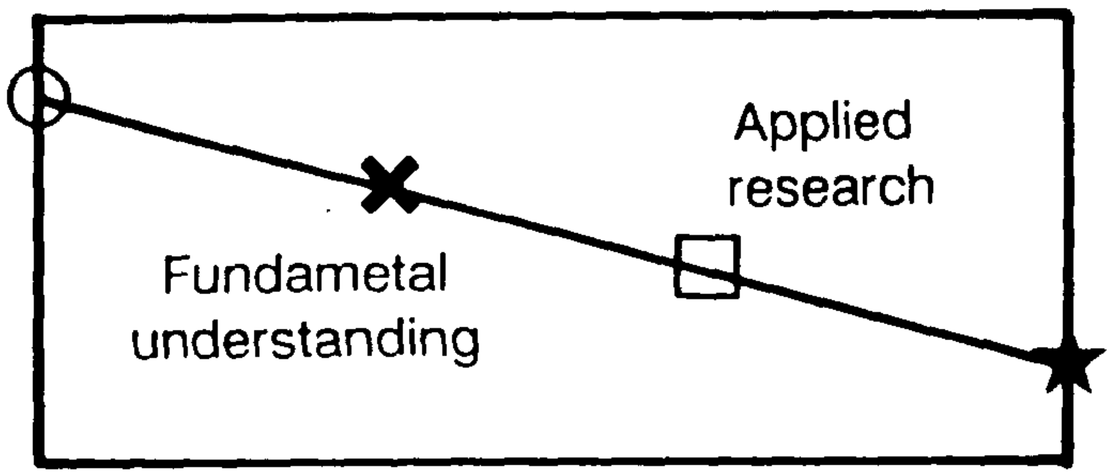
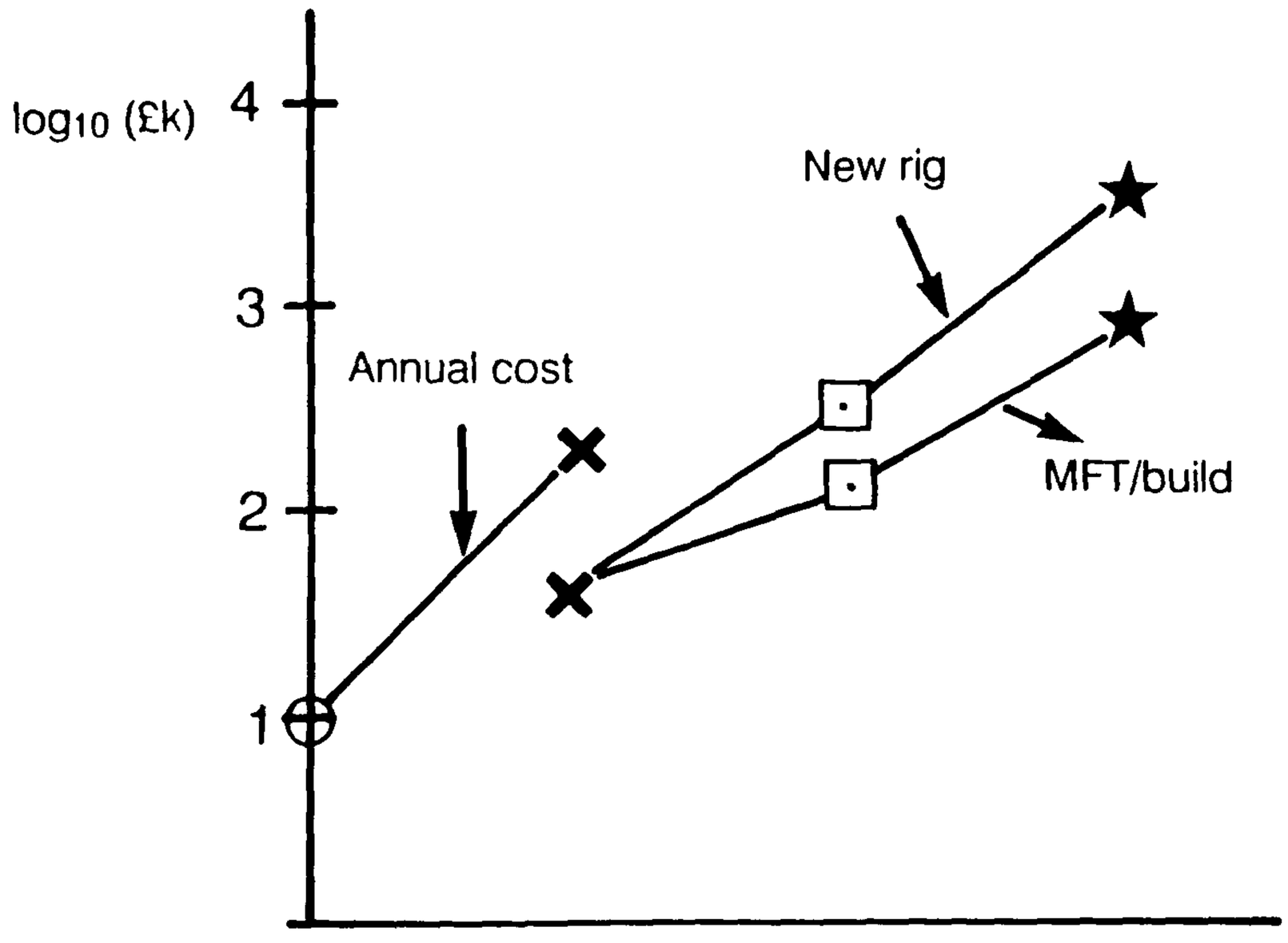


Fig 2.12

VML59990

Order of magnitude cost comparison and balance between applied research and fundamental



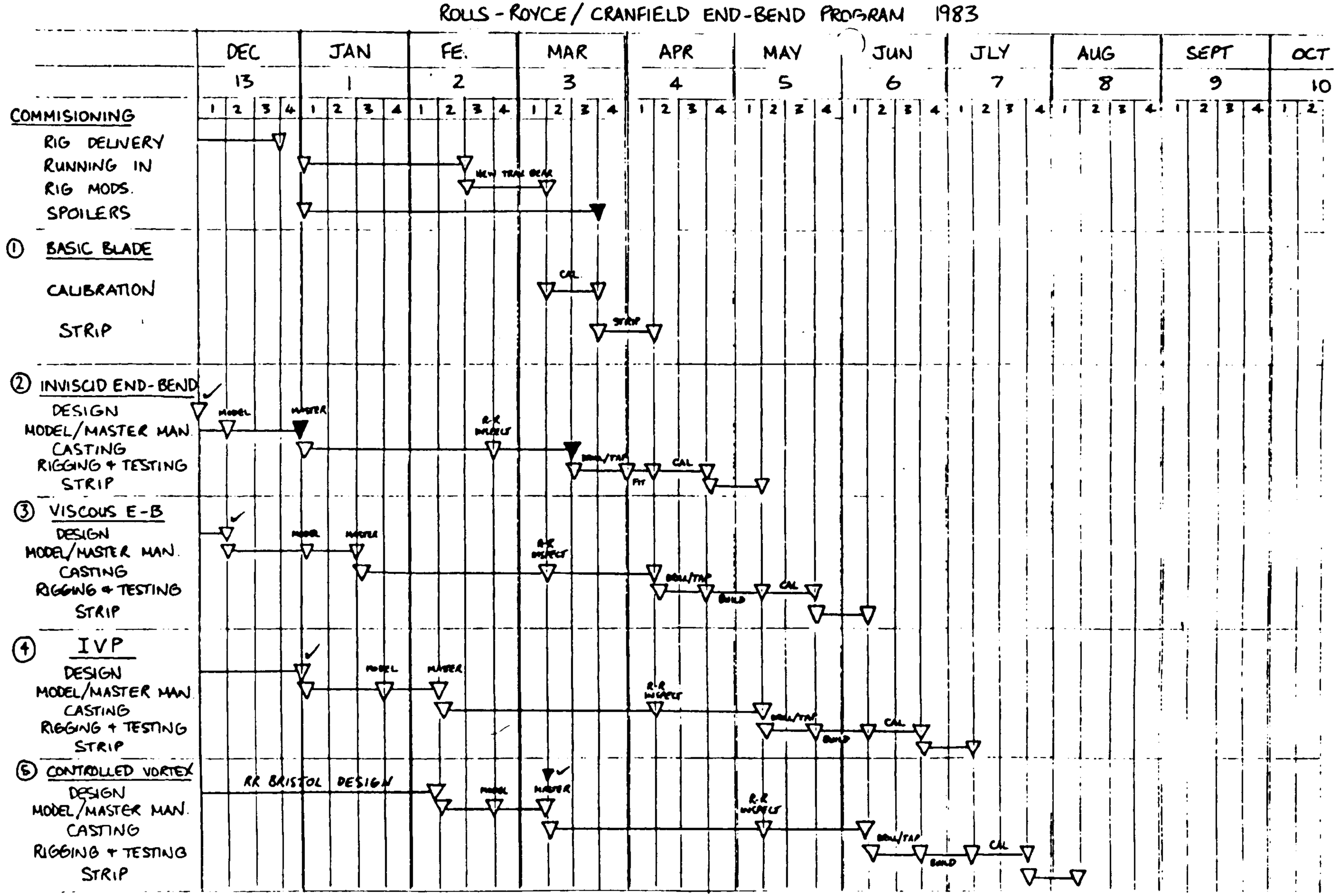


- ⊙ Linear cascades
- ✖ Low speed, multistage turbomachinery
- ⊡ Single stage high speed
- ★ Multistage high speed

Fig 2.13 **Balance of applied research/fundametal understanding**

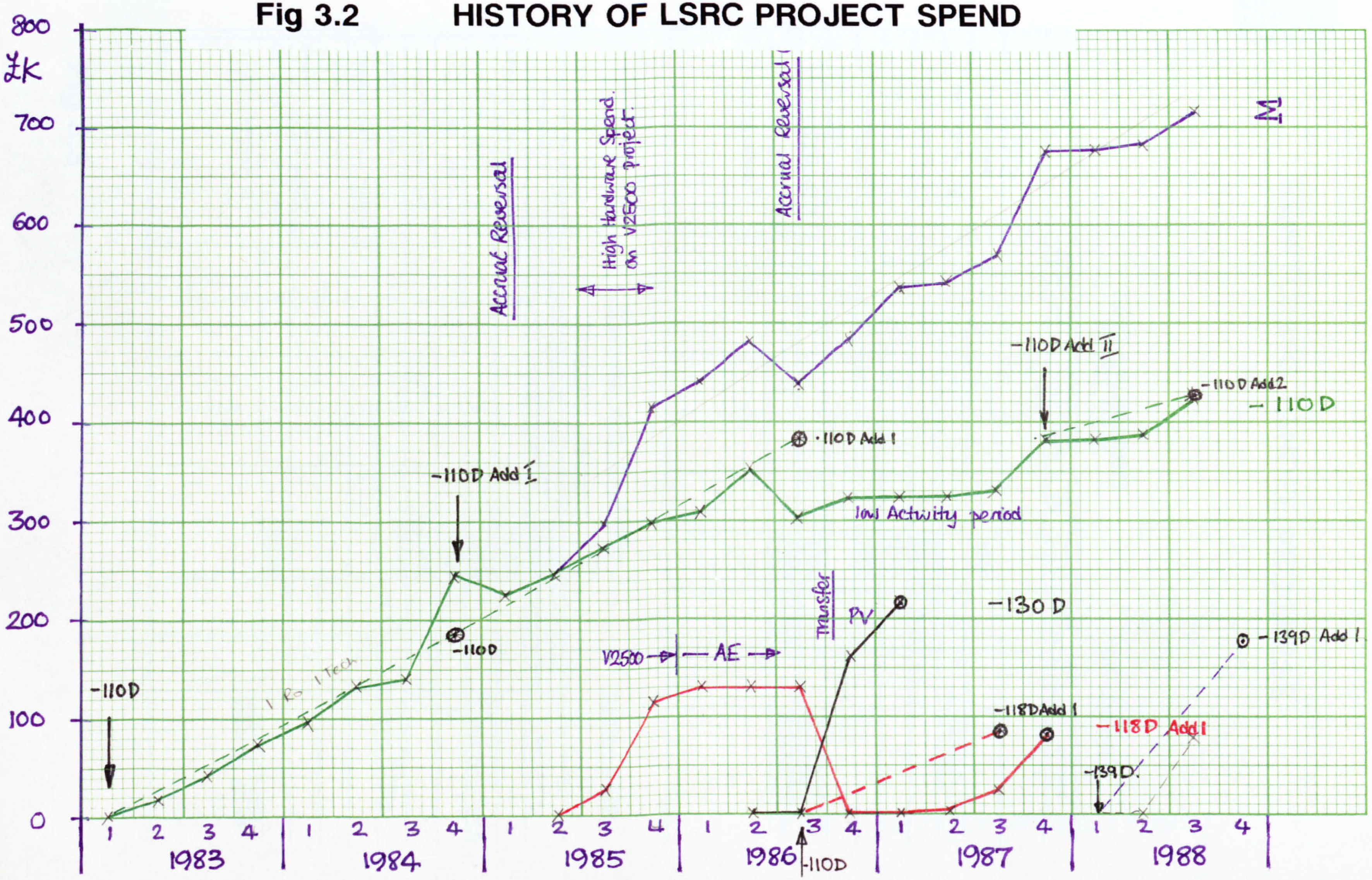
VML59991

Fig 3.1 THE FIRST LSRC PROJECT PLAN



C.J. Robinson RED/CRbn

Fig 3.2 HISTORY OF LSRC PROJECT SPEND



MONITORING TANDEE PROGRESS

TOOLING AND EQUIPMENT
PROGRESS REPORT

DATE:- 1 March 1983

ITEM	MATERIAL ORDERED	DESIGN COMPLETE	MATERIAL DELIVERED	WORK STARTED	WAITING FOR RIG	PLANNED COMPLETION	PARTS COMPLETE	PARTS EX-TANDEE	COMMENTS
SPOILER RINGS	✓		Due 4/3/83						
TRAVERSE RING	✓	✓	✓	✓		14/3/83			
YAW PROBES (5)	—	—	—			—	—	—	Waiting for Confirm Go ahead
TRAVERSE GEARS (6)	Some not all	4/3/83				8/4/83 – all 6 Some earlier (29/3/83 First one)			
STATIC TAPS	✓	✓	✓	✓		8/3/83			
MODIFIED LIFTING PLATES	✓	—	✓	TODAY		4/3/83			
TOTAL RAKES								1/3/83	
ORIGINAL TRAVERSE GEAR (Limit Switches)	✓		✓			11/3/83			Not totally upgraded to new spec - just limits
ALL WORK COMPLETE (RIG)	—	✓	—			+15 days from delay.	19/3/82?		Completion depends on delivery being now 7/3/83
ROLLER BEARING?									

TOOLING AND EQUIPMENT

PROGRESS REPORT

DATE:- 23/3/83

ITEM	MATERIAL ORDERED	DESIGN COMPLETE	MATERIAL DELIVERED	WORK STARTED	WAITING FOR RIG	PLANNED COMPLETION	PARTS COMPLETE	PARTS EX-TANDEE	COMMENTS
SPOILER RINGS						30/3/83			
TRAVERSE RING						28/3/83 30/3/83			Ring Mounting Blocks + Bridges
YAW PROBE (5)						14/4/83			
TRAVERSE GEARS (6)			In post			14/4/83			
STATIC TAPS						30/3/83	✓		Mounting Rings waiting for fitting
MODIFIED LIFTING PLATES								✓	
TOTAL RAKES									
ORIGINAL TRAVERSE GEAR (LIMIT SWITCHES)								✓	
ALL WORK COMPLETE (RIG)						19/4/83			
STATOR + LABRYNTH SEALS									Despatch on 30/3/83 Return on 6/4/83

Fig 3.3

AXIAL COMPRESSOR ROTOR : 3D FLOW PHENOMENA

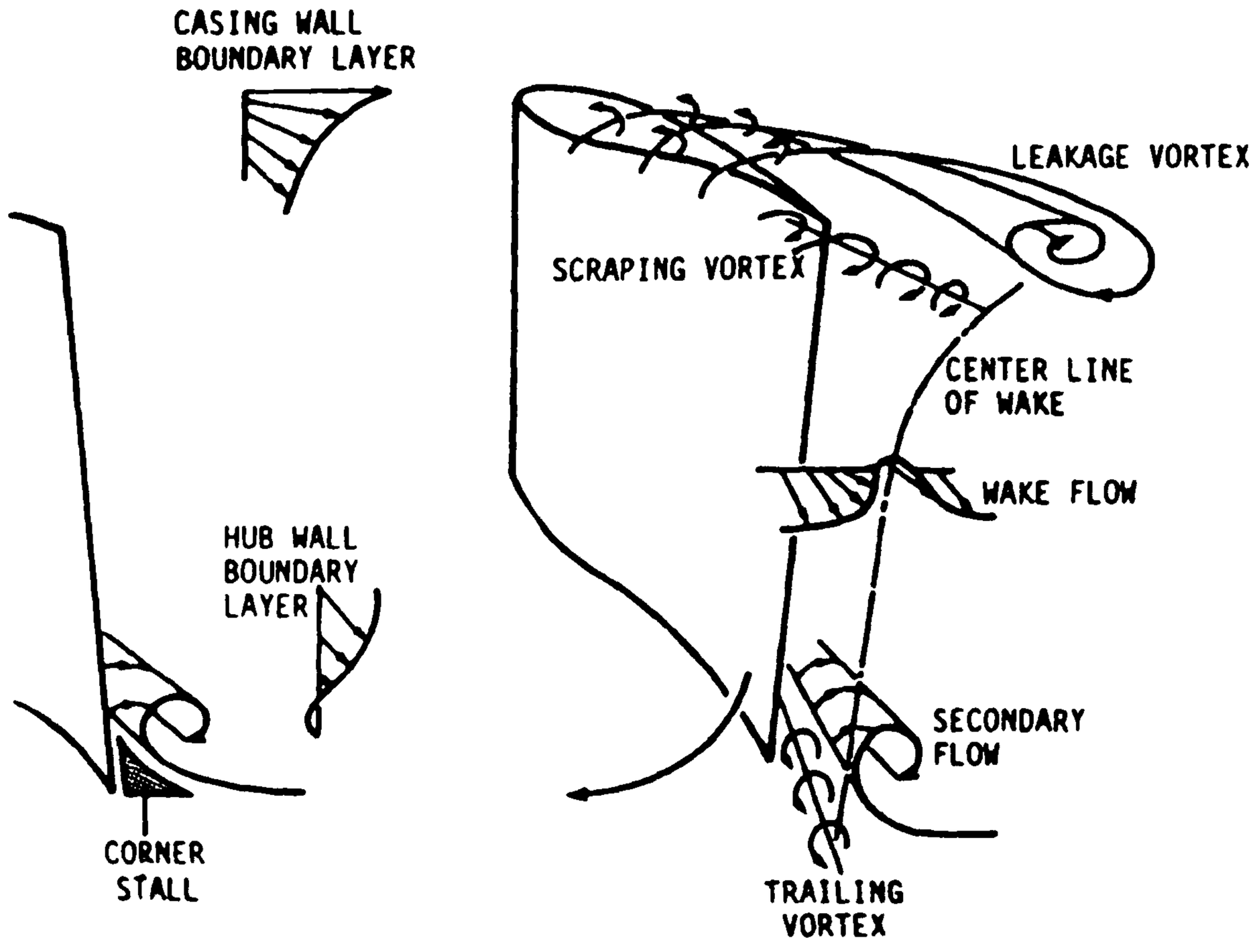


Fig 4.1

Inoue and Kuromaru (1984)

FLOW THROUGH A CLEARANCE GAP

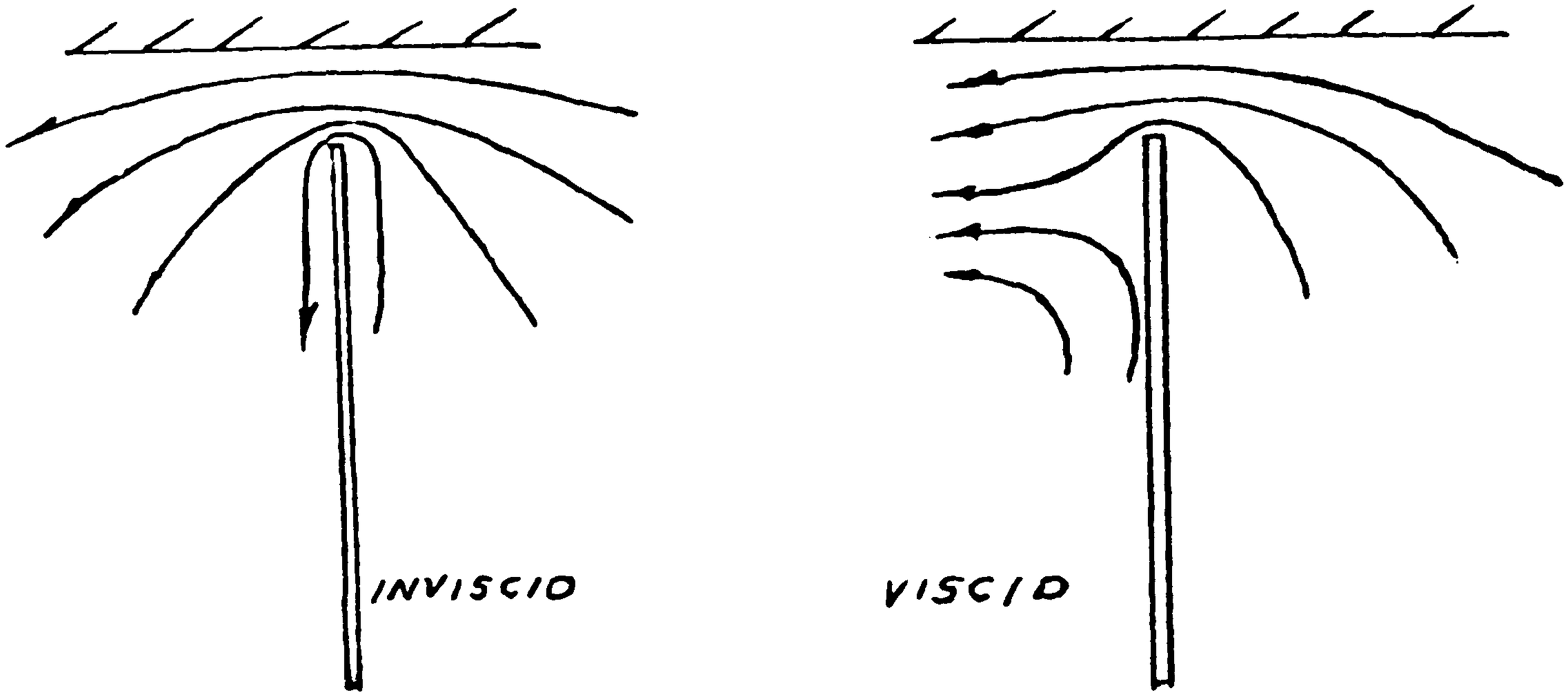


Fig 4.2

From Dean (1954)

TYPICAL VECTOR △ GEOMETRY

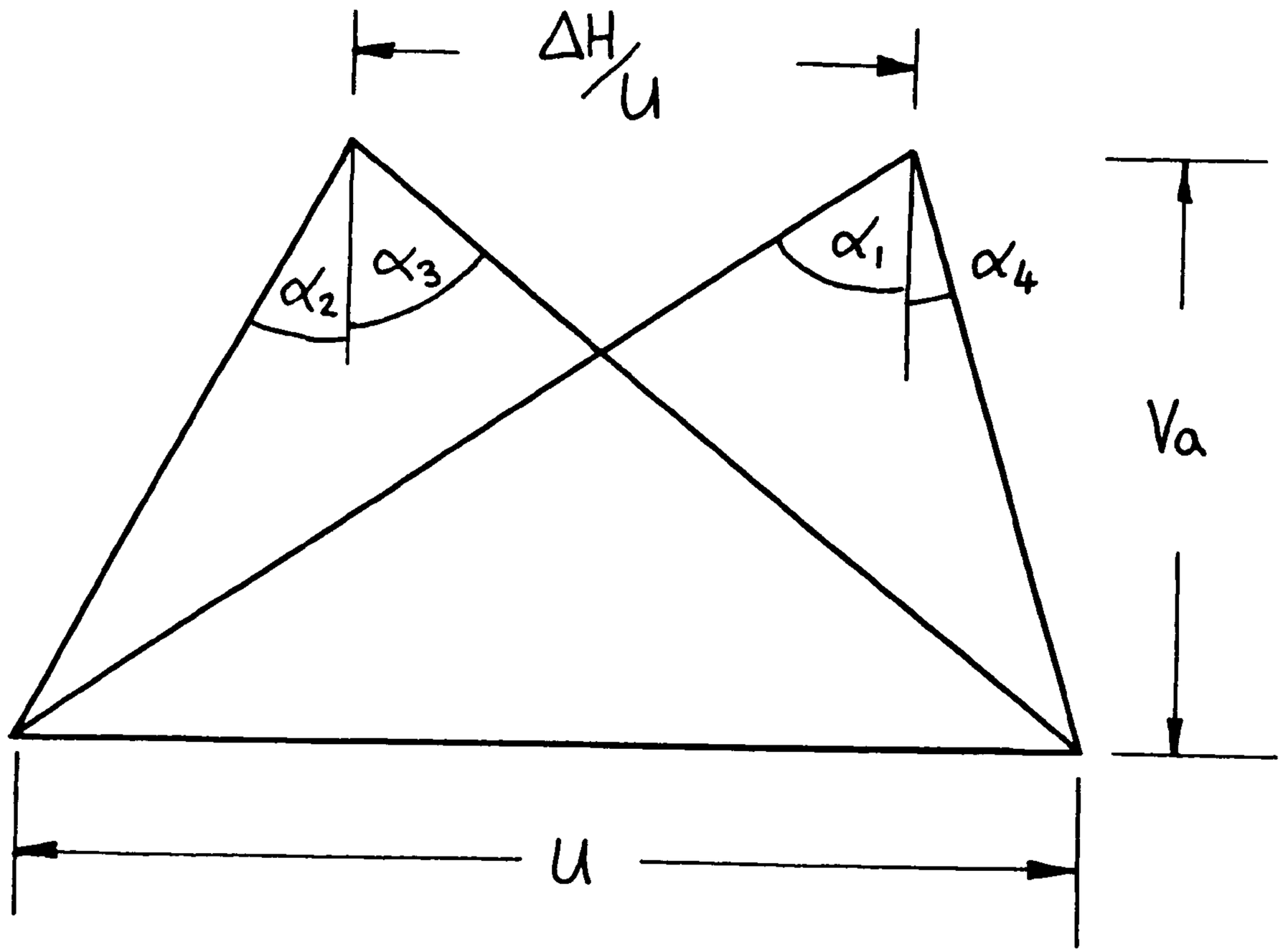


Fig 4.3

COMPARISON BETWEEN VAP, VWD AND FREE VORTEX

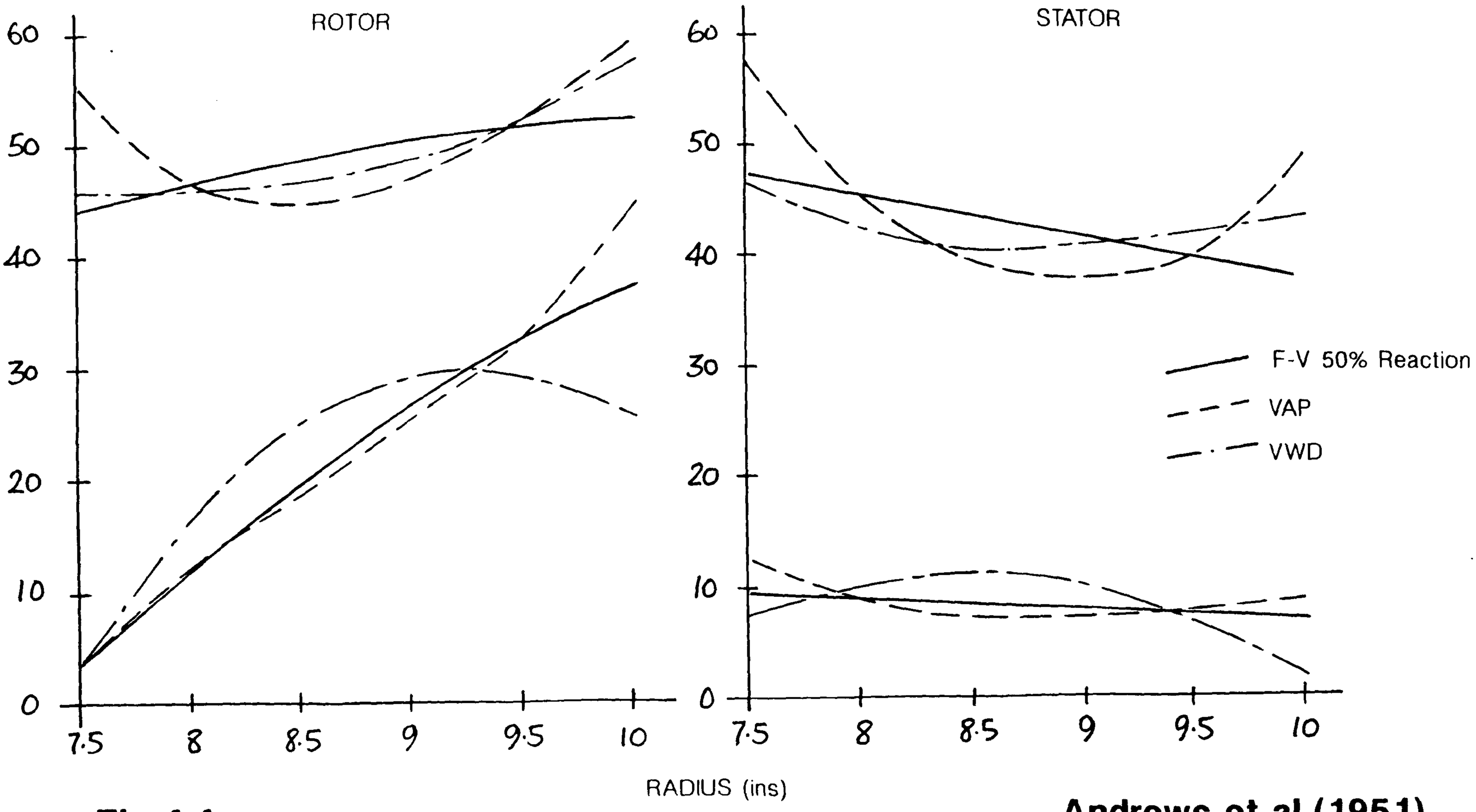
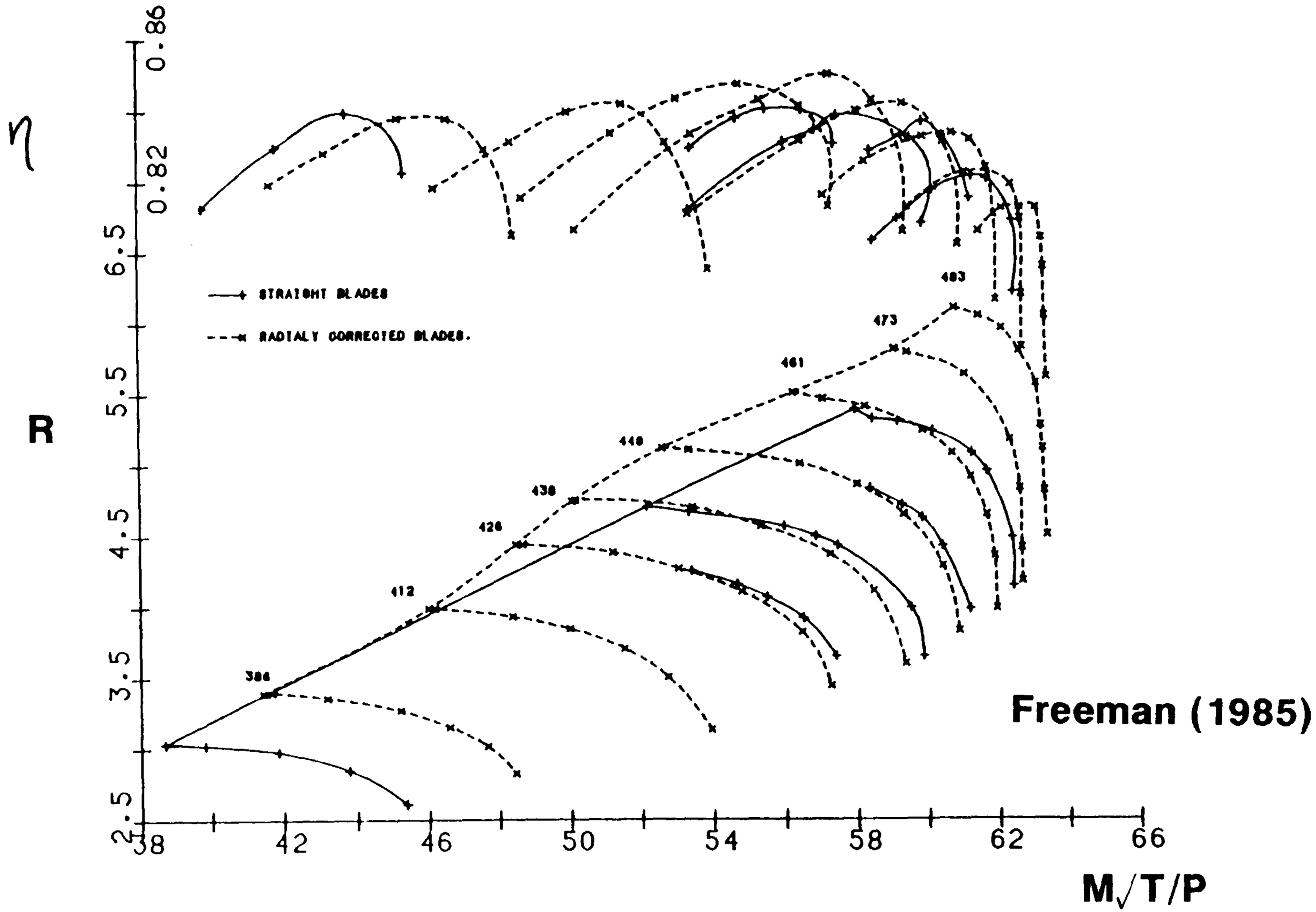


Fig 4.4

Andrews et al (1951)

PERFORMANCE IMPROVEMENT WITH END-BENDS



Freeman (1985)

Fig 4.5

COMPRESSOR AERODYNAMIC DESIGN FLOWCHART

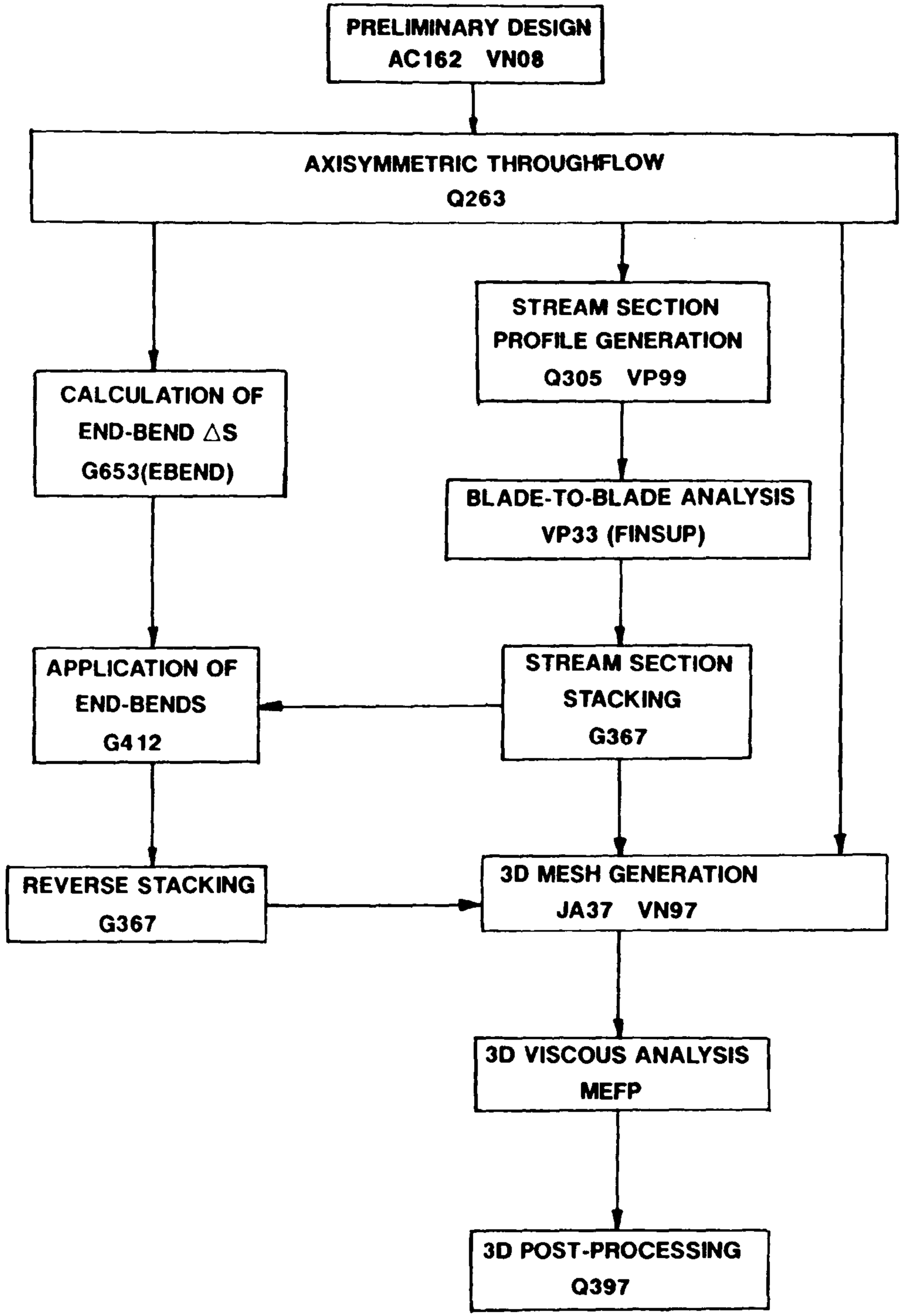


Fig 5.1

DESIGN ANNULUS DCA BLADING

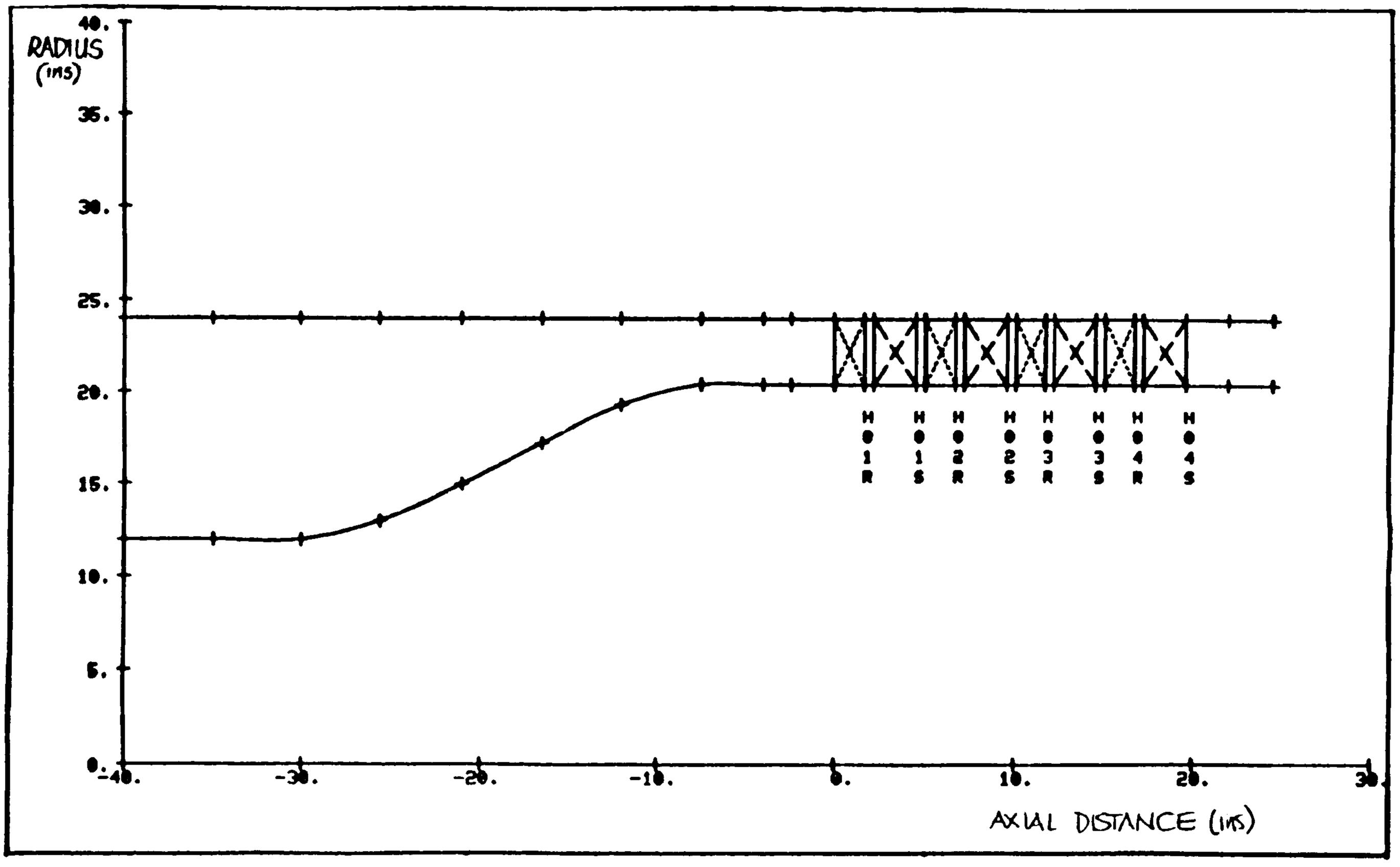
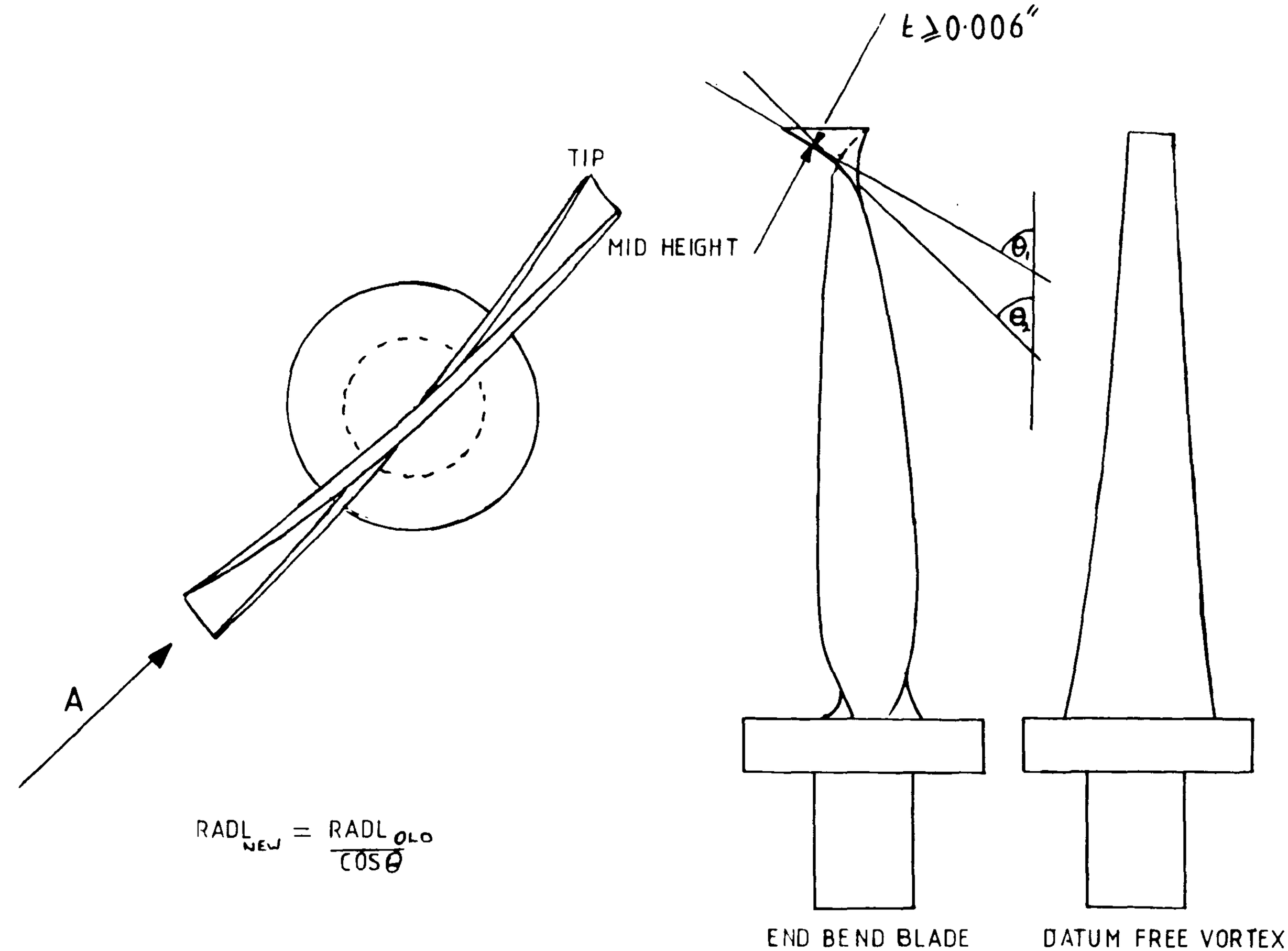


Fig 5.2

DCA INVISCID END-BENDS : EDGE RADII



$$RADL_{NEW} = \frac{RADL_{OLD}}{COS\theta}$$

WHERE : RADL = LEADING EDGE CIRCLE RADIUS

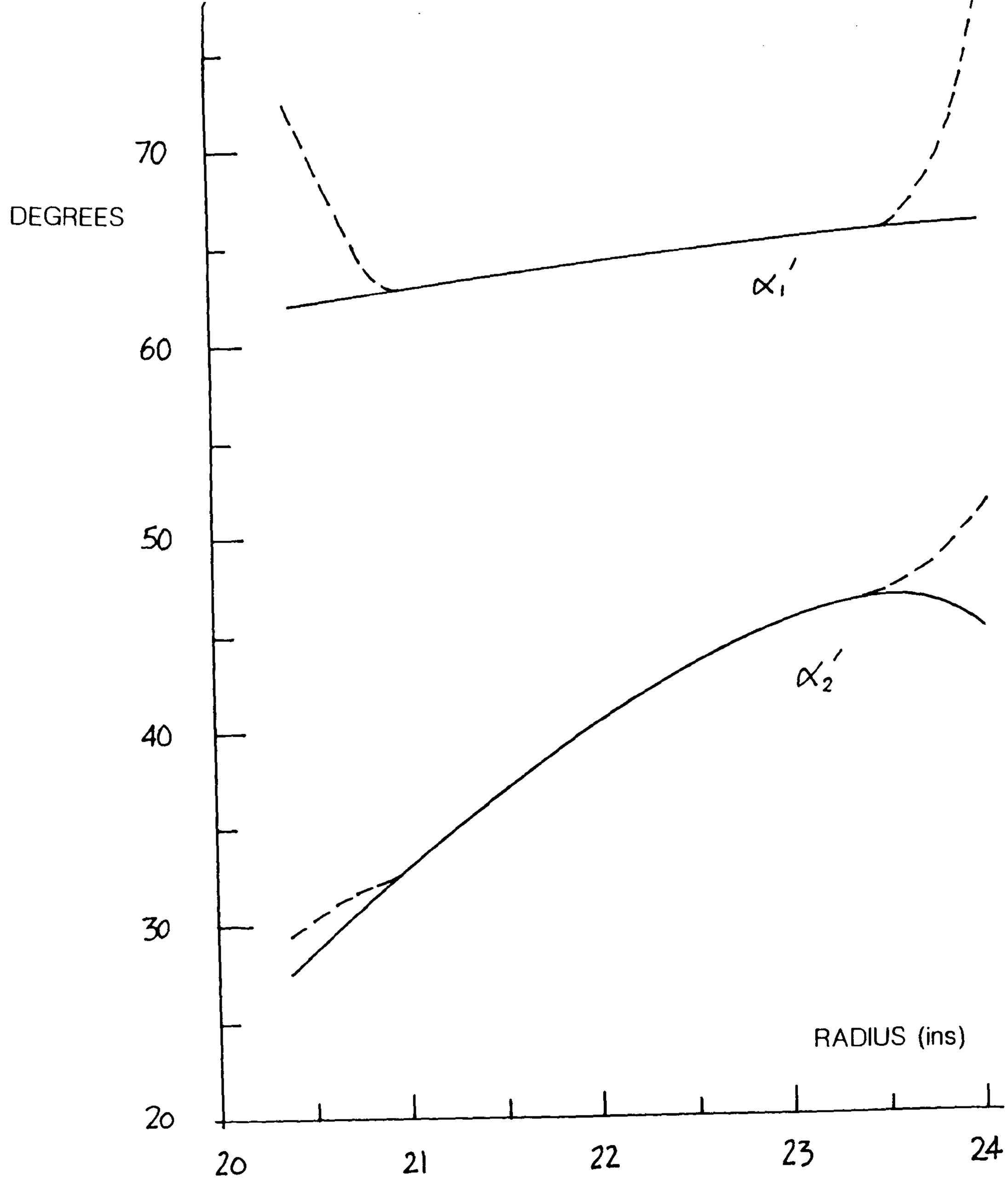
Fig 5.3

DCA BLADING
ROTOR ANGLES

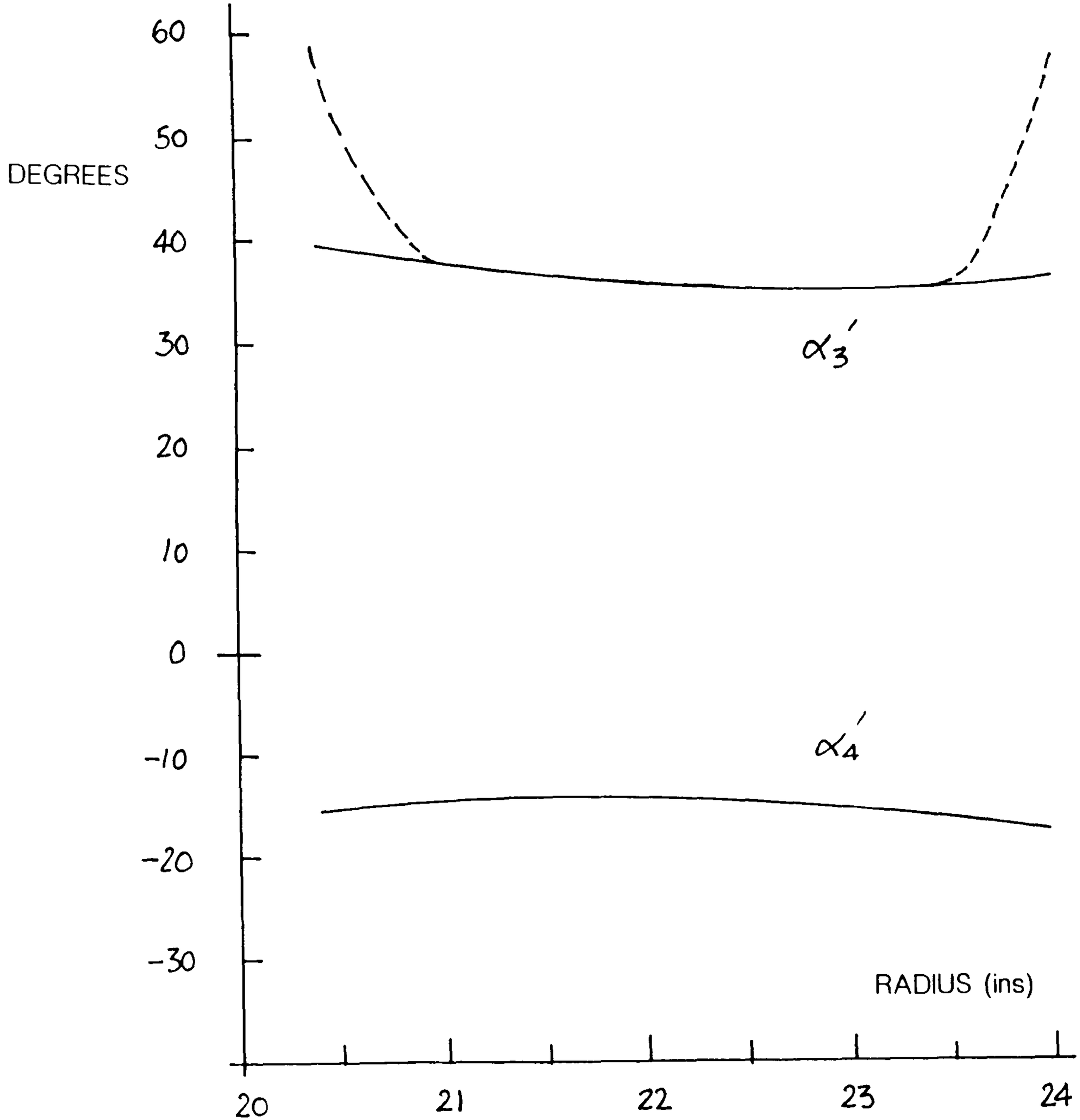
—— Conventional

– – – End-Bent

Fig 5.4



DCA BLADING
STATOR ANGLES



—— Conventional

- - - End-Bent

Fig 5.5

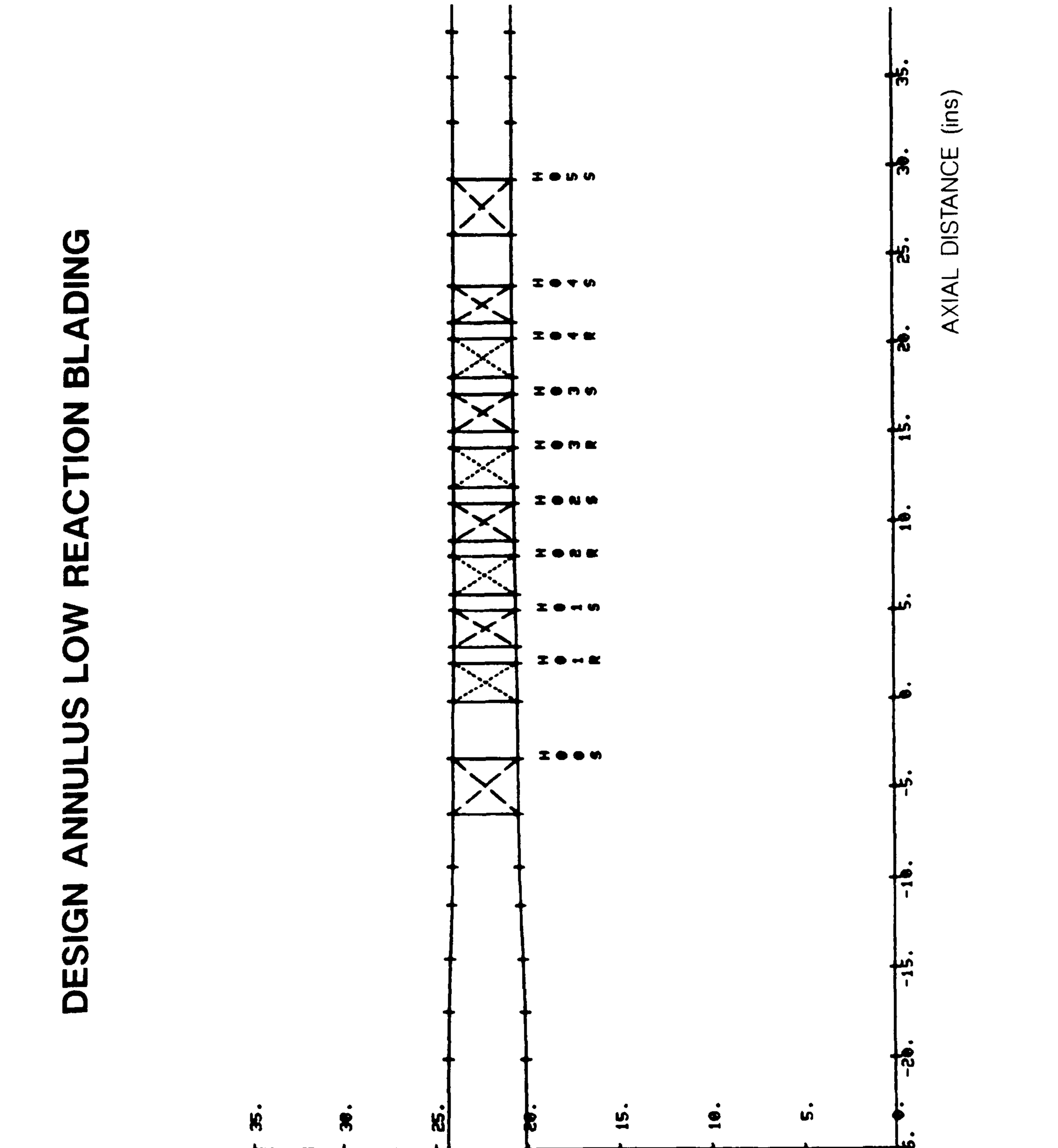

DESIGN ANNULUS LOW REACTION BLADING
H.P.S.
H.P.R.
H.T.S.
H.T.R.
H.3.S.
H.3.R.
H.2.S.
H.2.R.
H.1.S.
H.1.R.
H.P.S.
35.
30.
25.
20.
15.
10.
5.
-5.
-10.
-15.
-20.
-25.
RADIUS (ins)
AXIAL DISTANCE (ins)

Fig 5.6

EFFECT OF INLET MACH NUMBER ON STATOR DIFFUSION

s/c = 0.825 t/c = 0.070 θ = 39.8 ζ = 27.0 i = -2

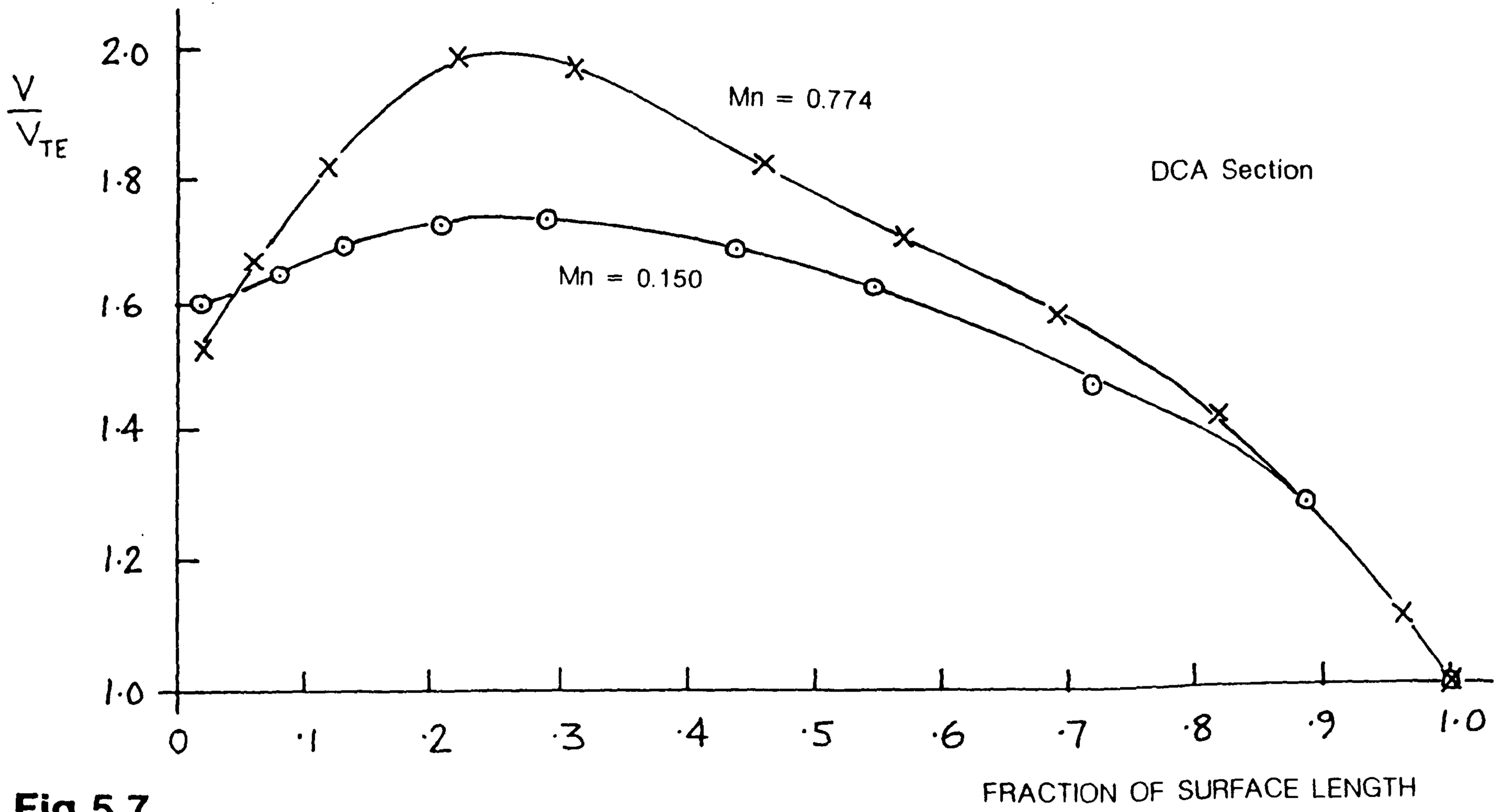


Fig 5.7

IGV SURFACE MACH NUMBER DISTRIBUTION

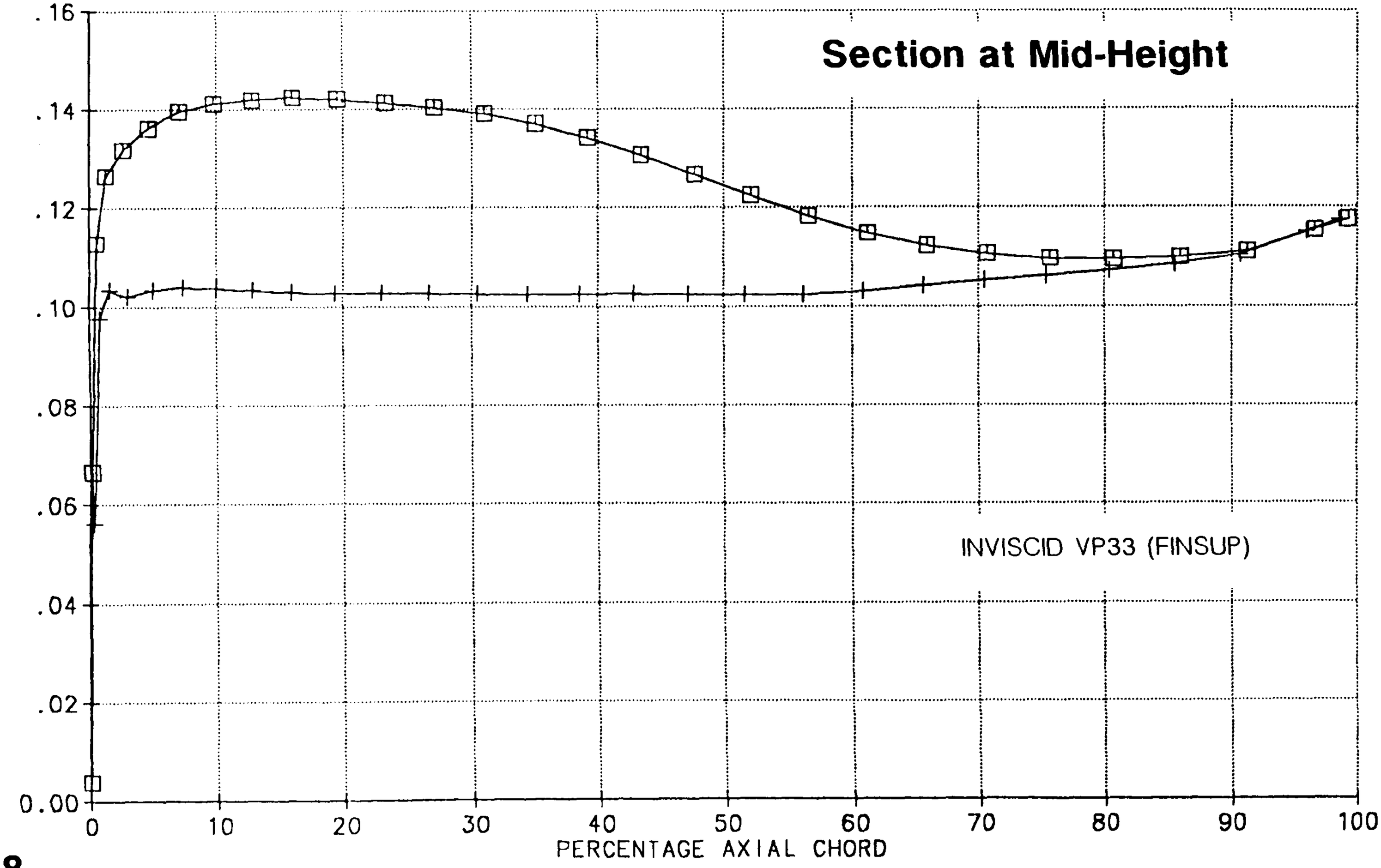


Fig 5.8

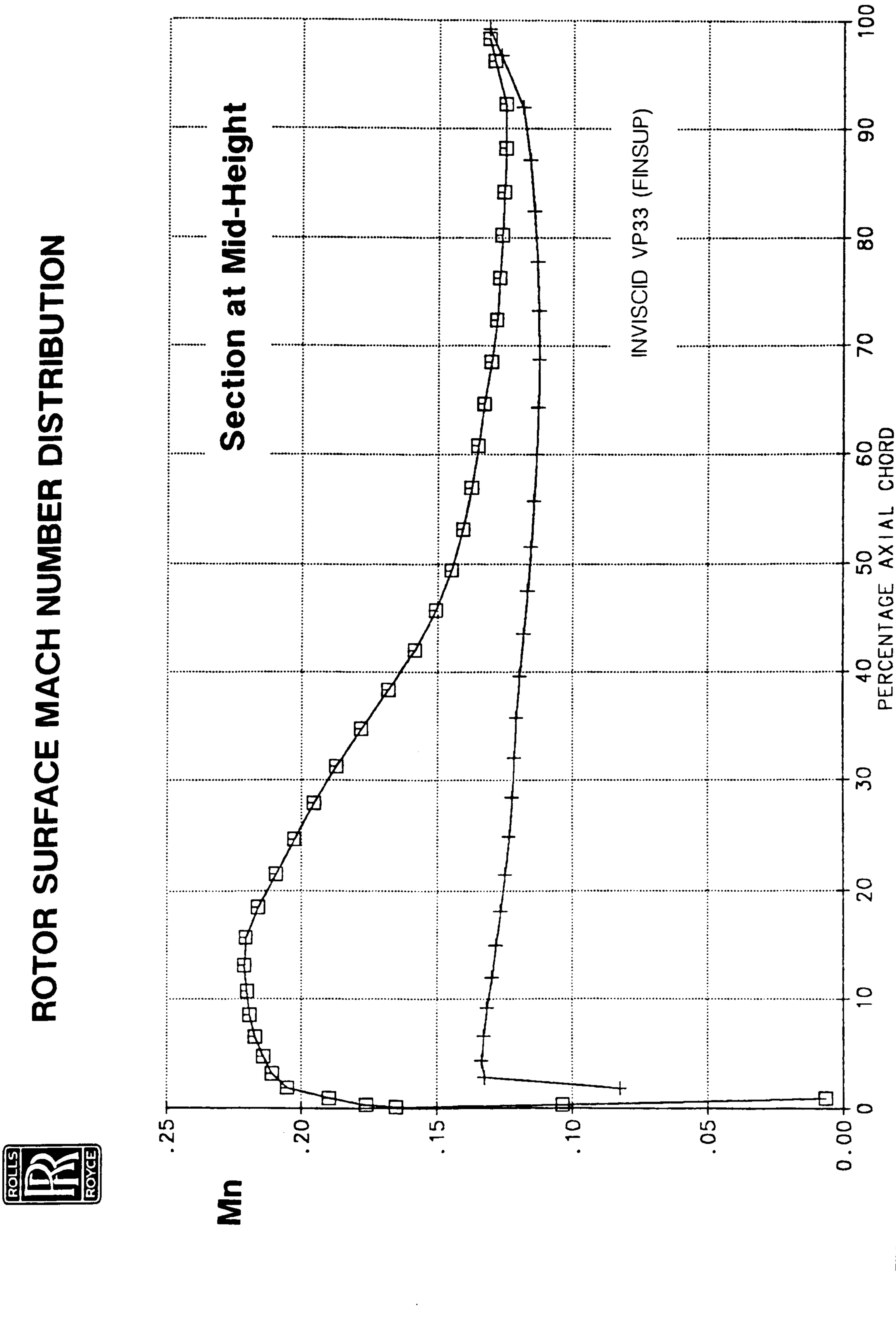

ROTOR SURFACE MACH NUMBER DISTRIBUTION
Section at Mid-Height
INVISCID VP33 (FINSUP)
PERCENTAGE AXIAL CHORD
0
10
20
30
40
50
60
70
80
90
100
Mn
.25
.20
.15
.10
.05
0.00

Fig 5.9

STATOR SURFACE MACH NUMBER DISTRIBUTION

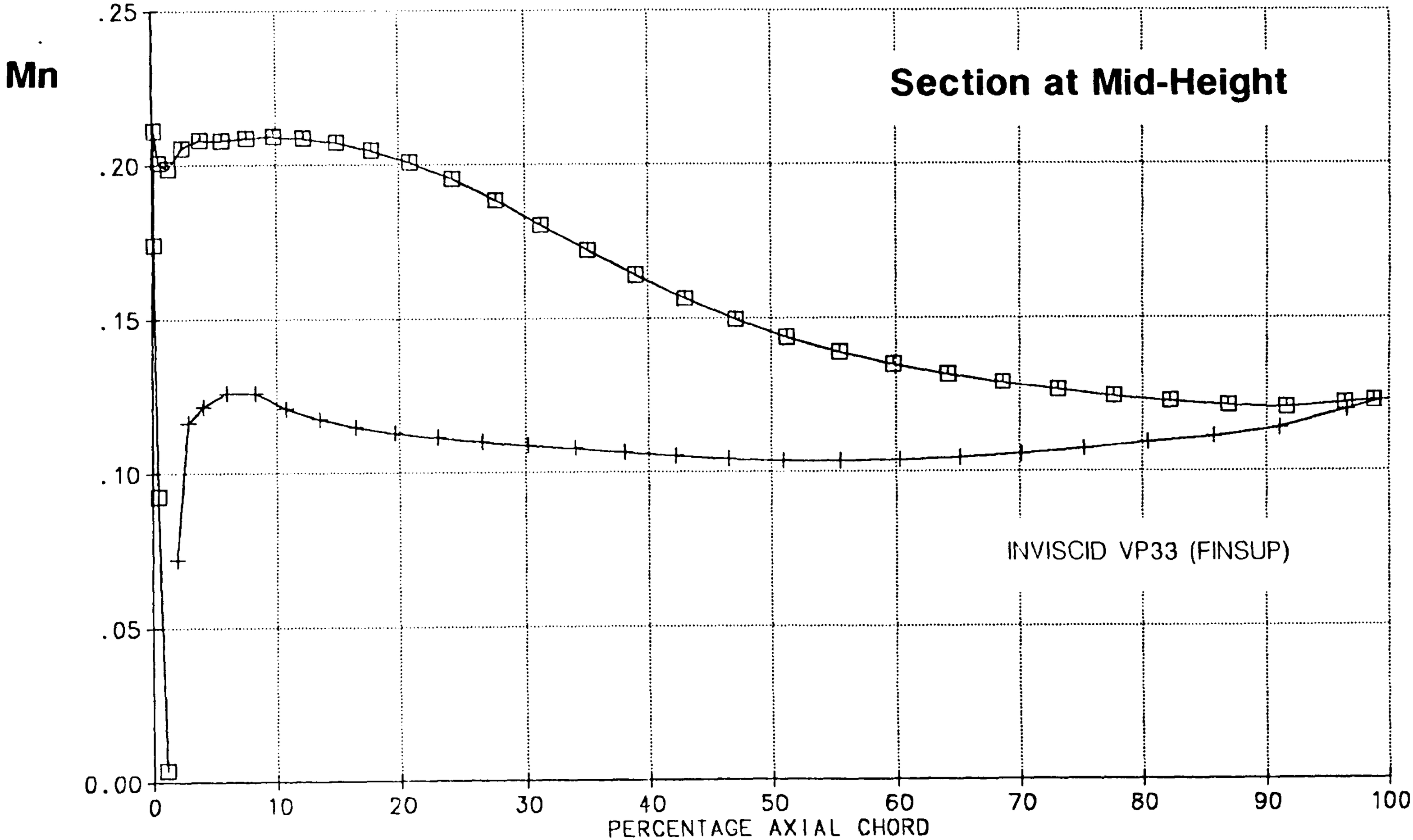


Fig 5.10

NON-DIM SUCTION SURFACE VELOCITIES

Rotor Mid-Height

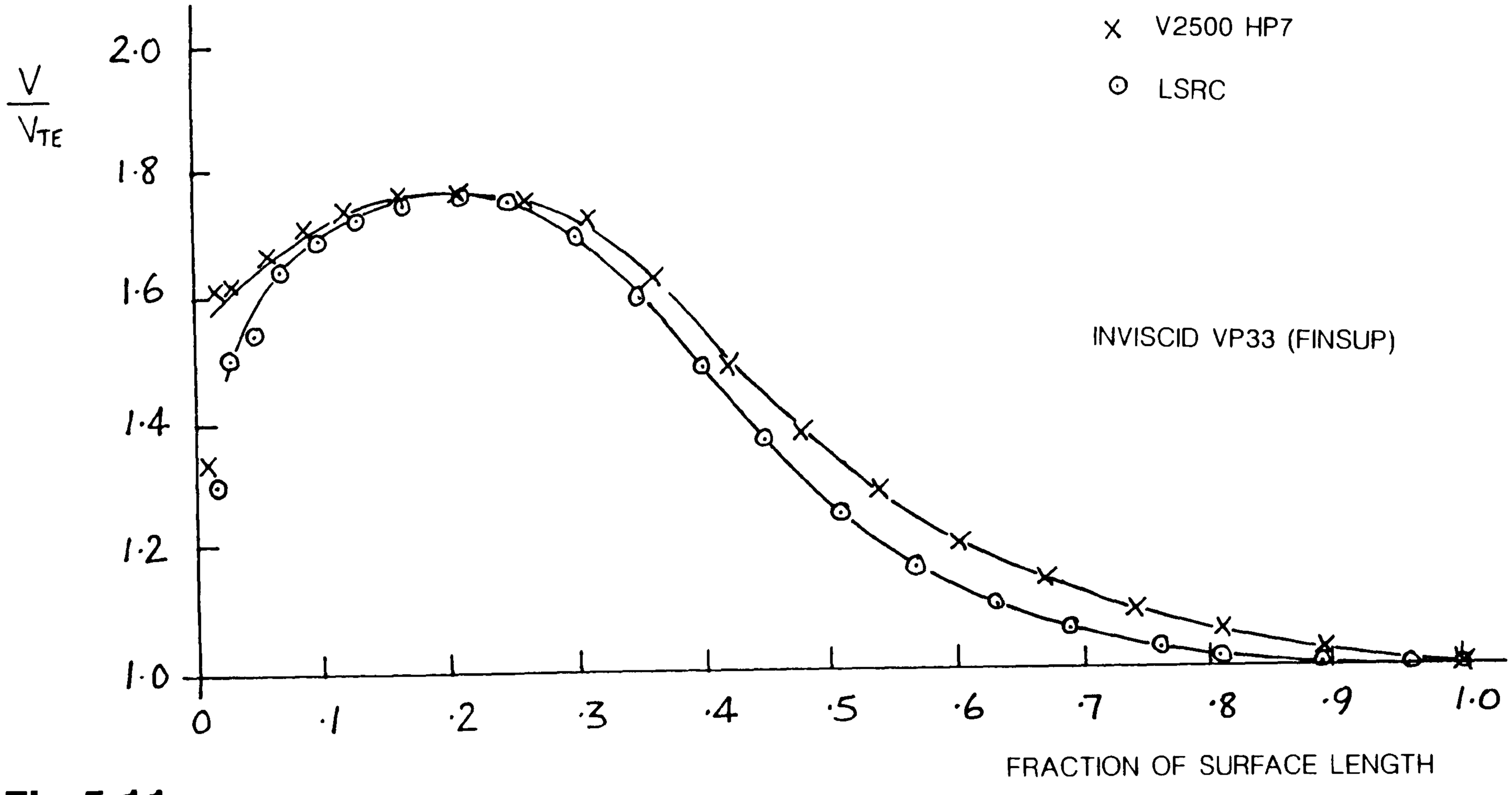


Fig 5.11

NON-DIM SUCTION SURFACE VELOCITIES

Stator Mid-Height

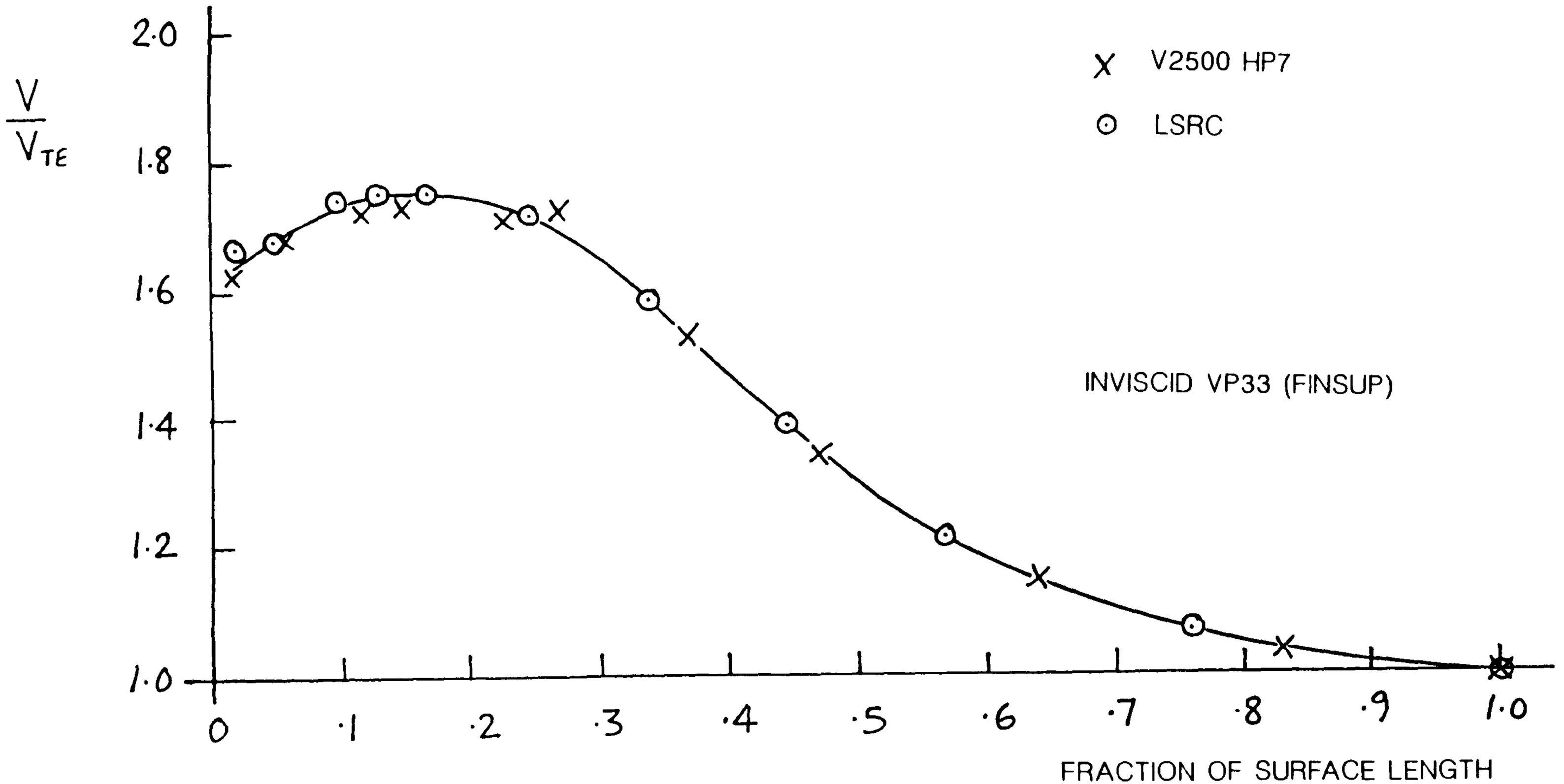
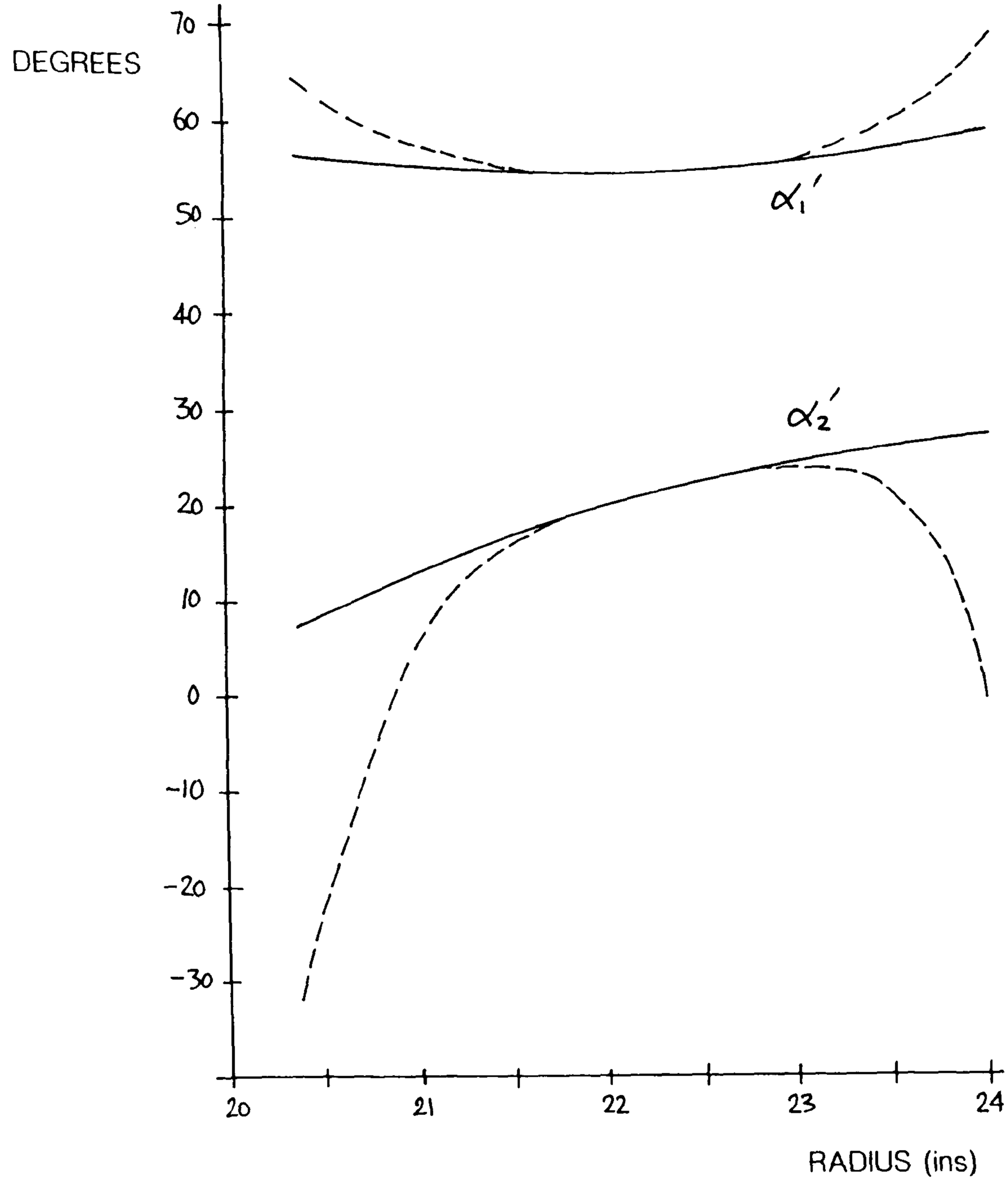


Fig 5.12

LOW-REACTION BLADING

ROTOR ANGLES

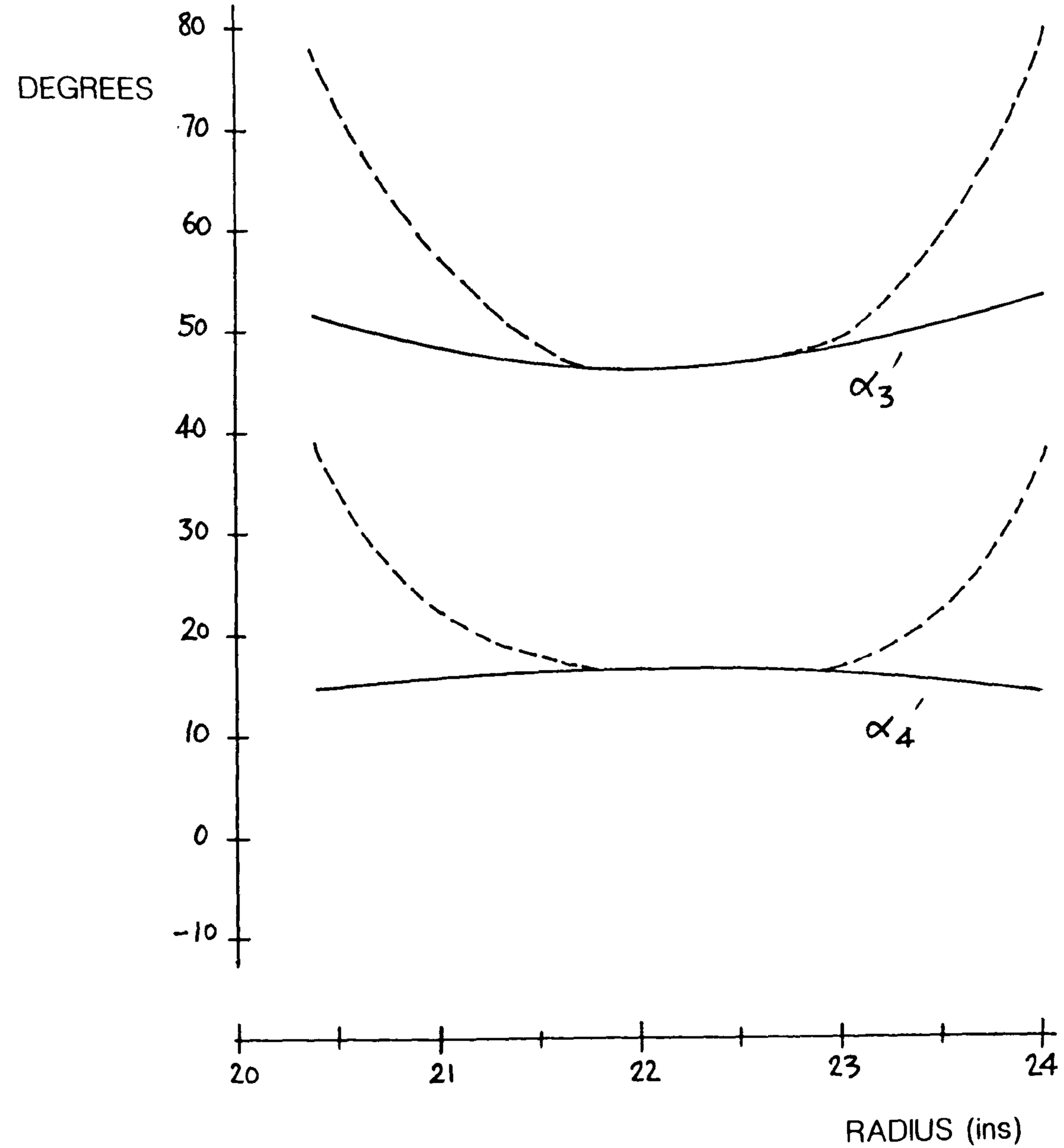


——— Conventional

– – – End-Bent

Fig 5.13

LOW-REACTION BLADING
STATOR ANGLES



—— Conventional

– – – End-Bent

Fig 5.14

LOW SPEED 4-STAGE RESEARCH COMPRESSOR

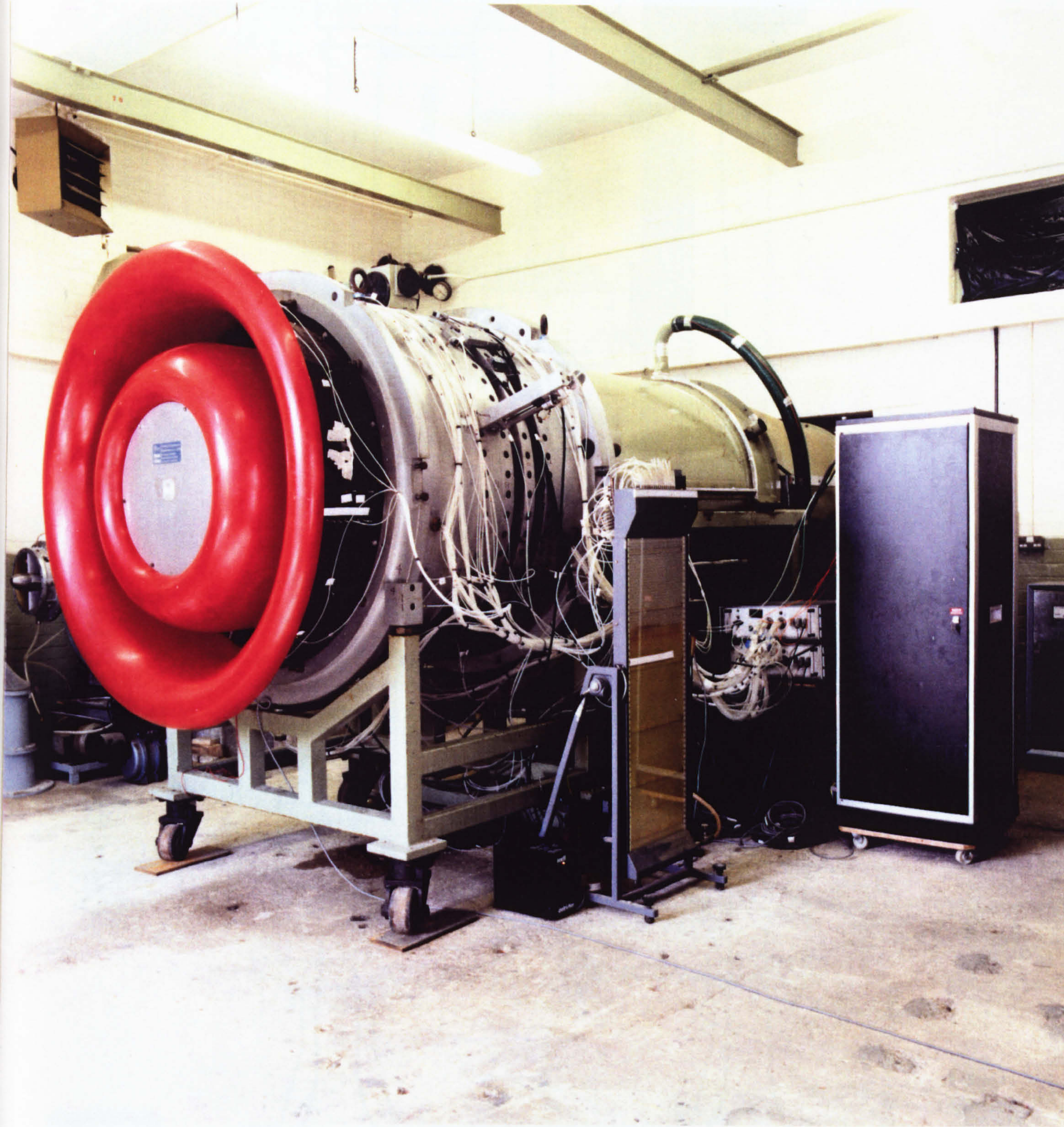


Fig 6.1 1985

CRANFIELD 4-STAGE LSRC FACILITY

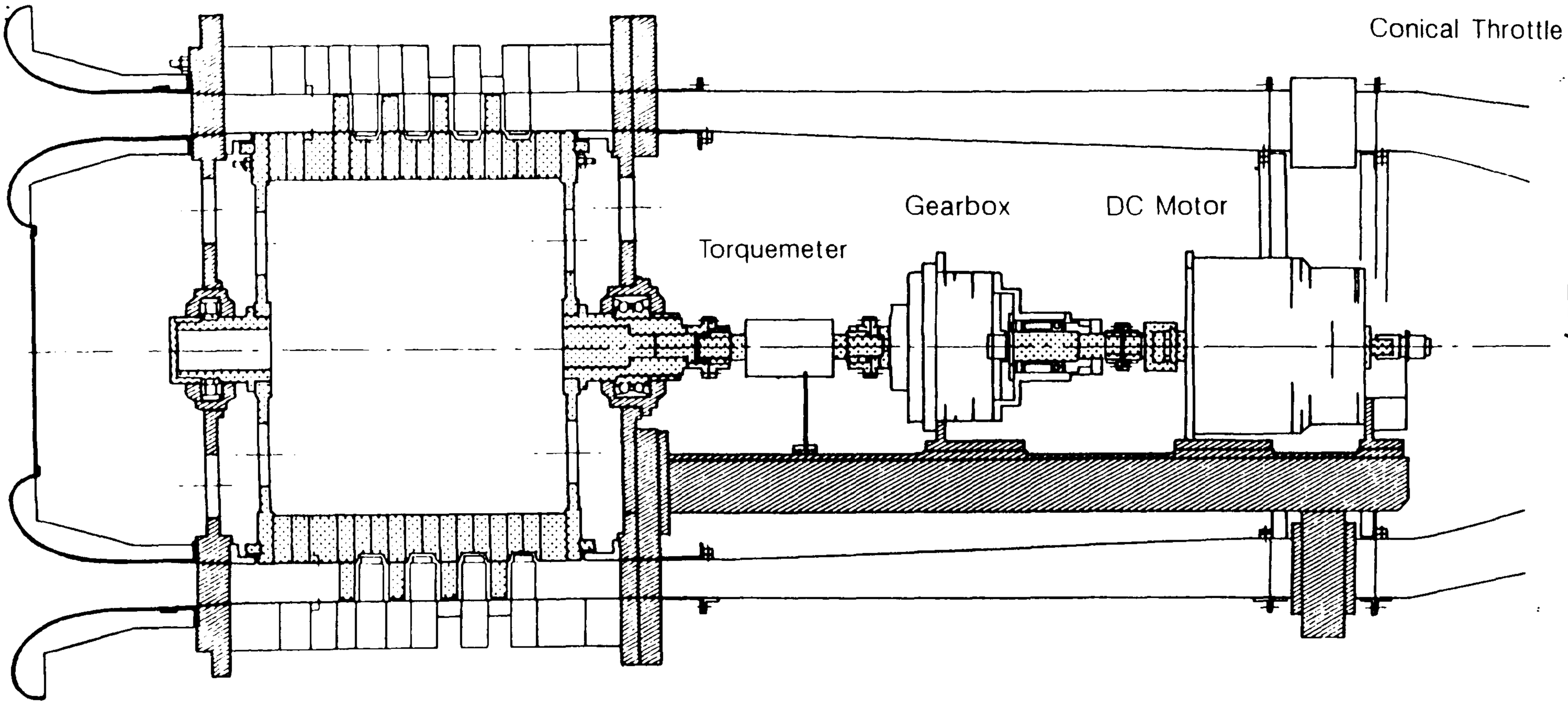
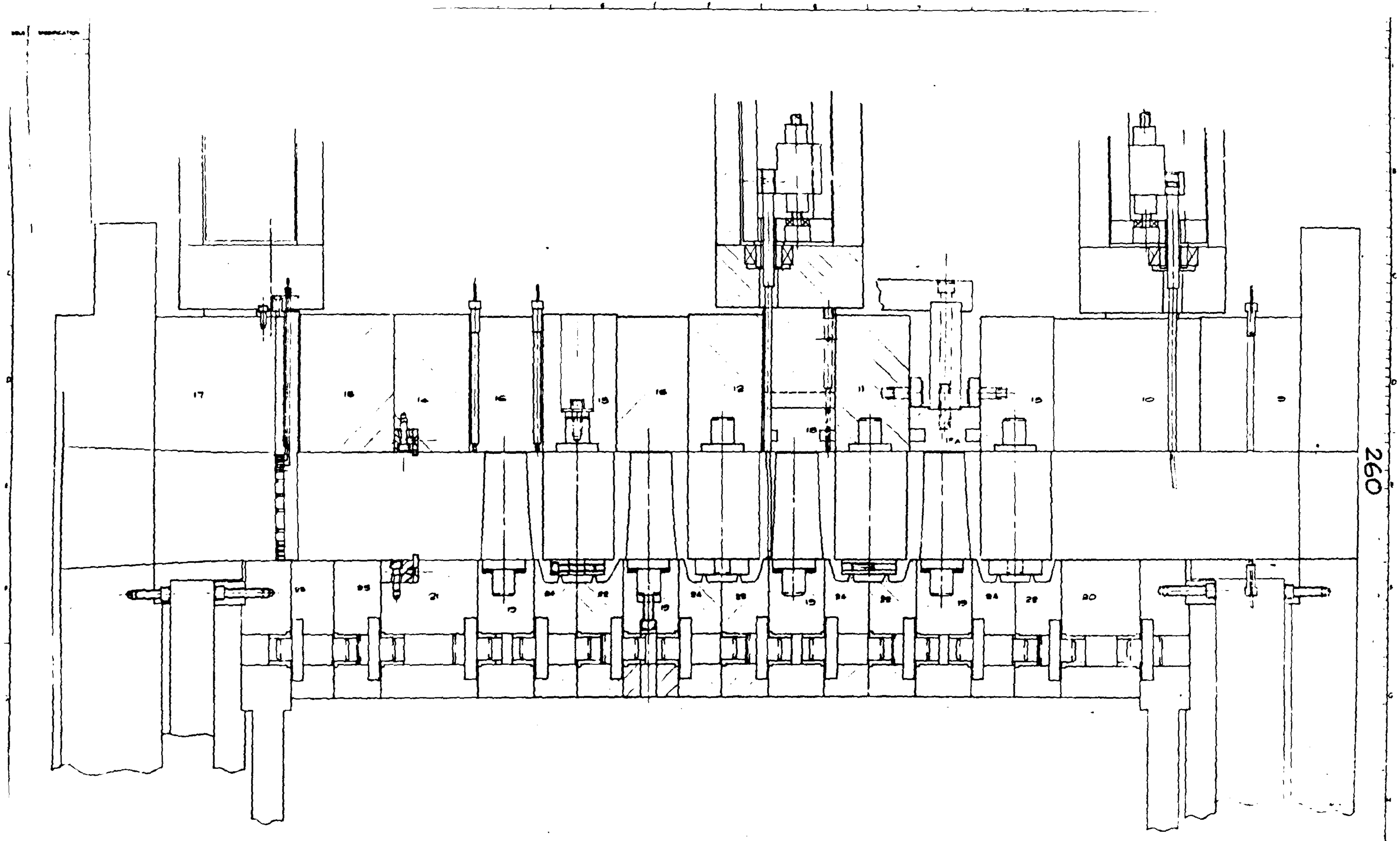
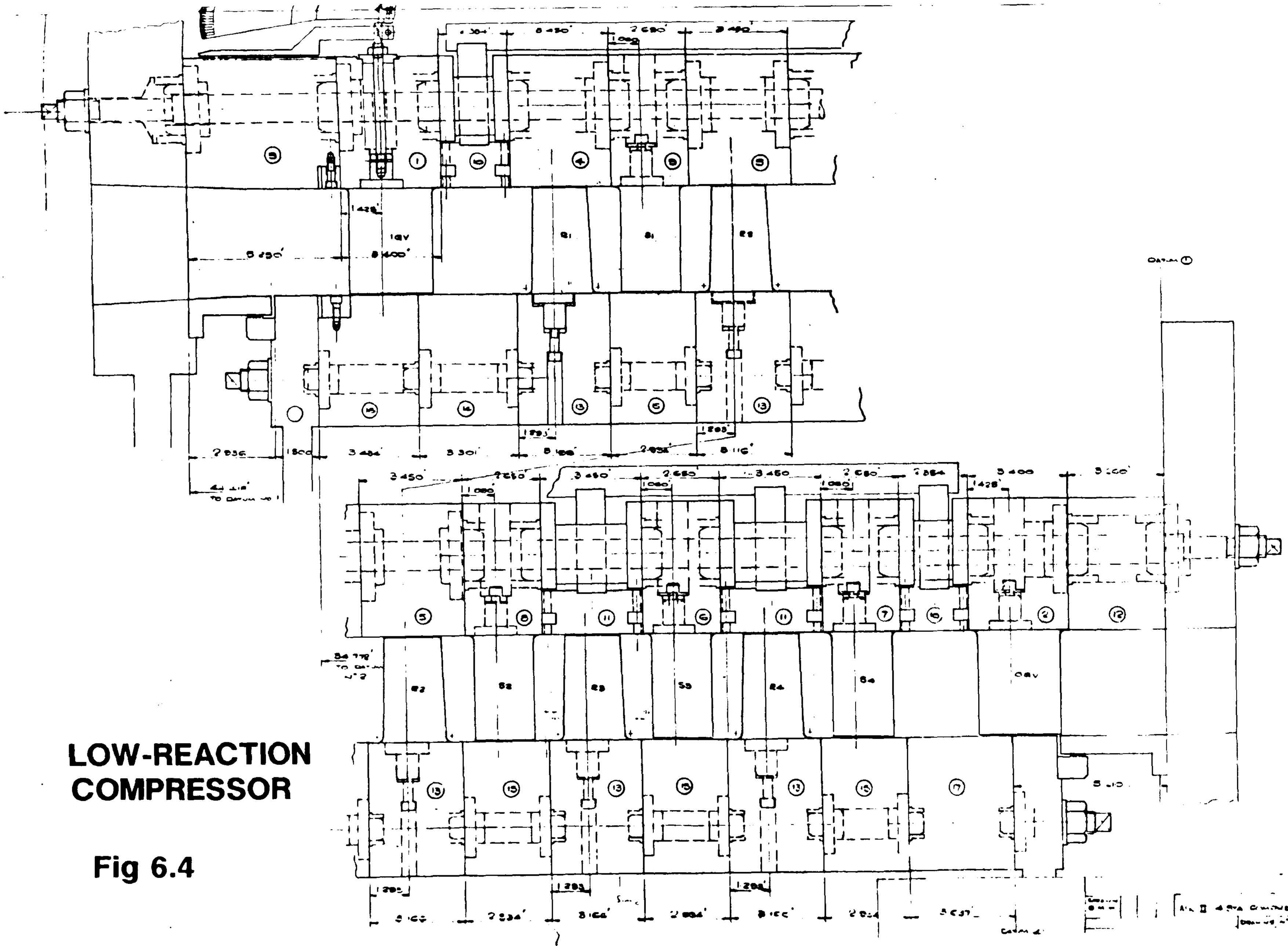


Fig 6.2



ZERO∝ COMPRESSOR

Fig 6.3



LOW-REACTION COMPRESSOR

Fig 6.4

TRAVERSE GEAR MOUNTED ON THE STUDY STAGE

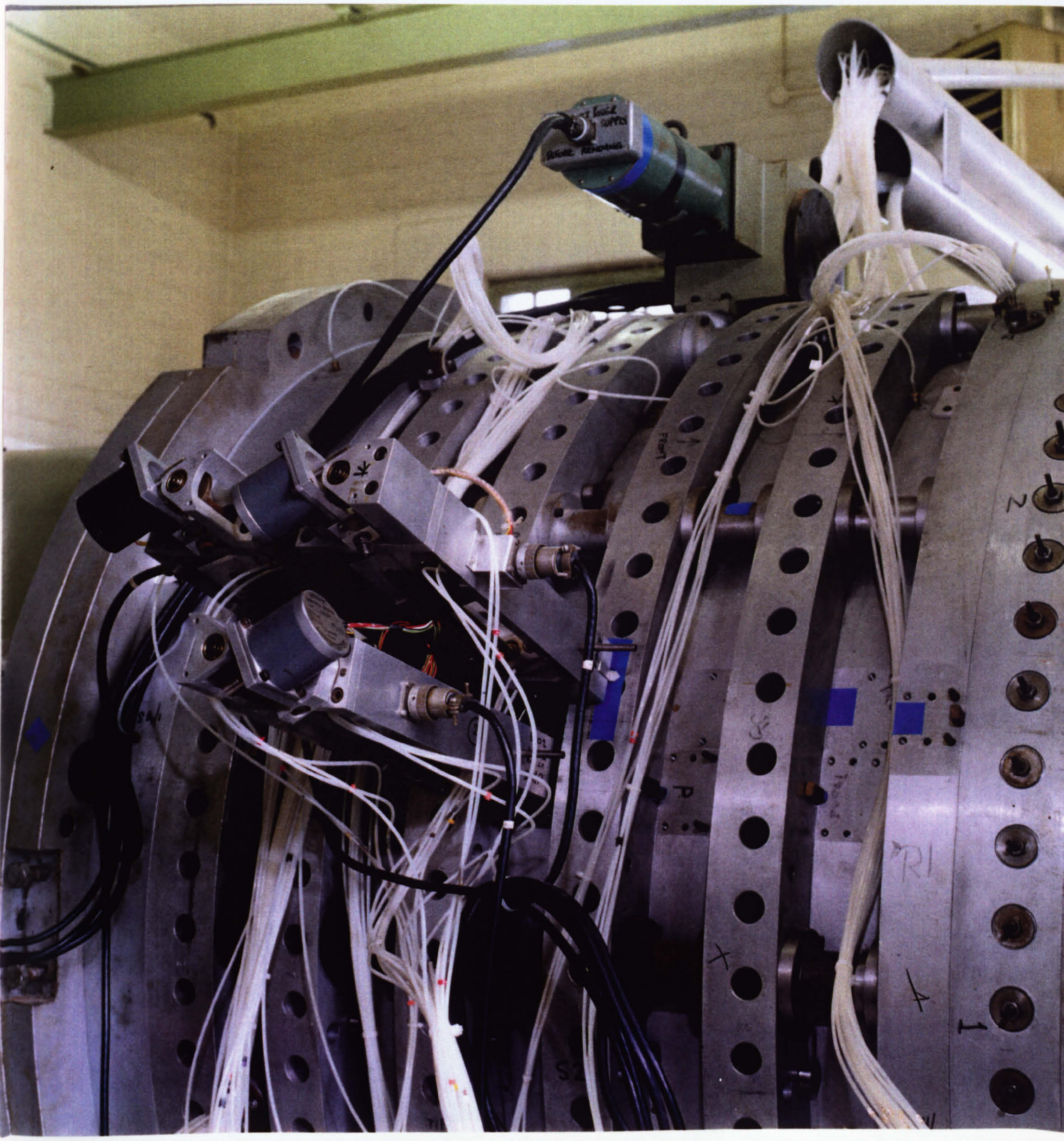


Fig 6.5

LSRC DCA BLADING

Fig 6.6

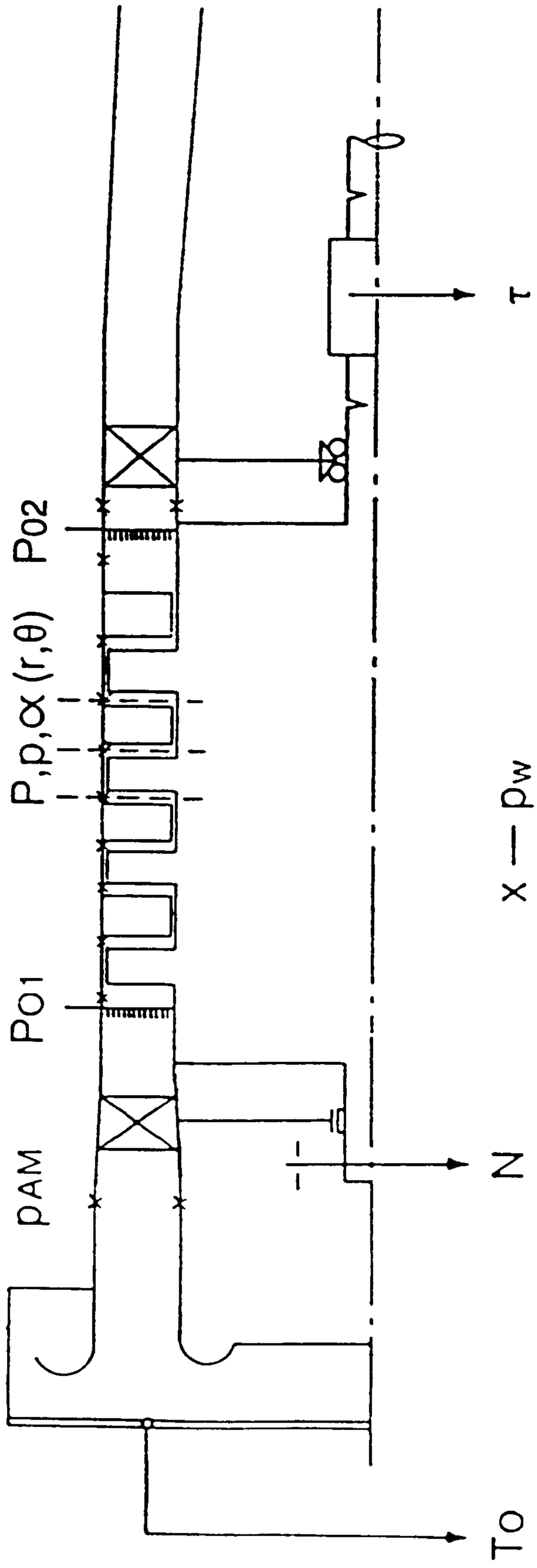


Fig 6.7

DATA LOGGING SYSTEM SCHEMATIC

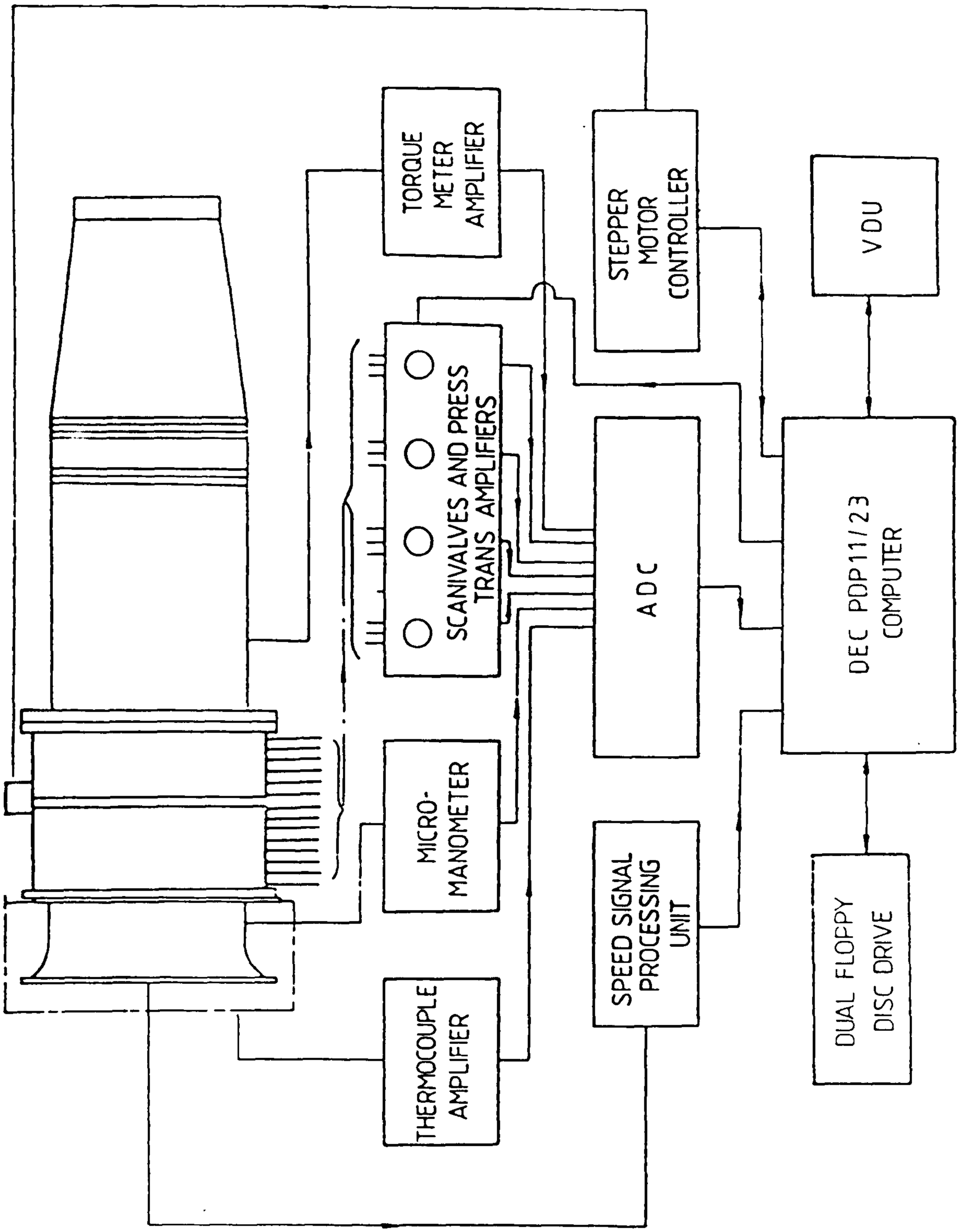


Fig 6.8

LSRC TRAVERSE GEAR

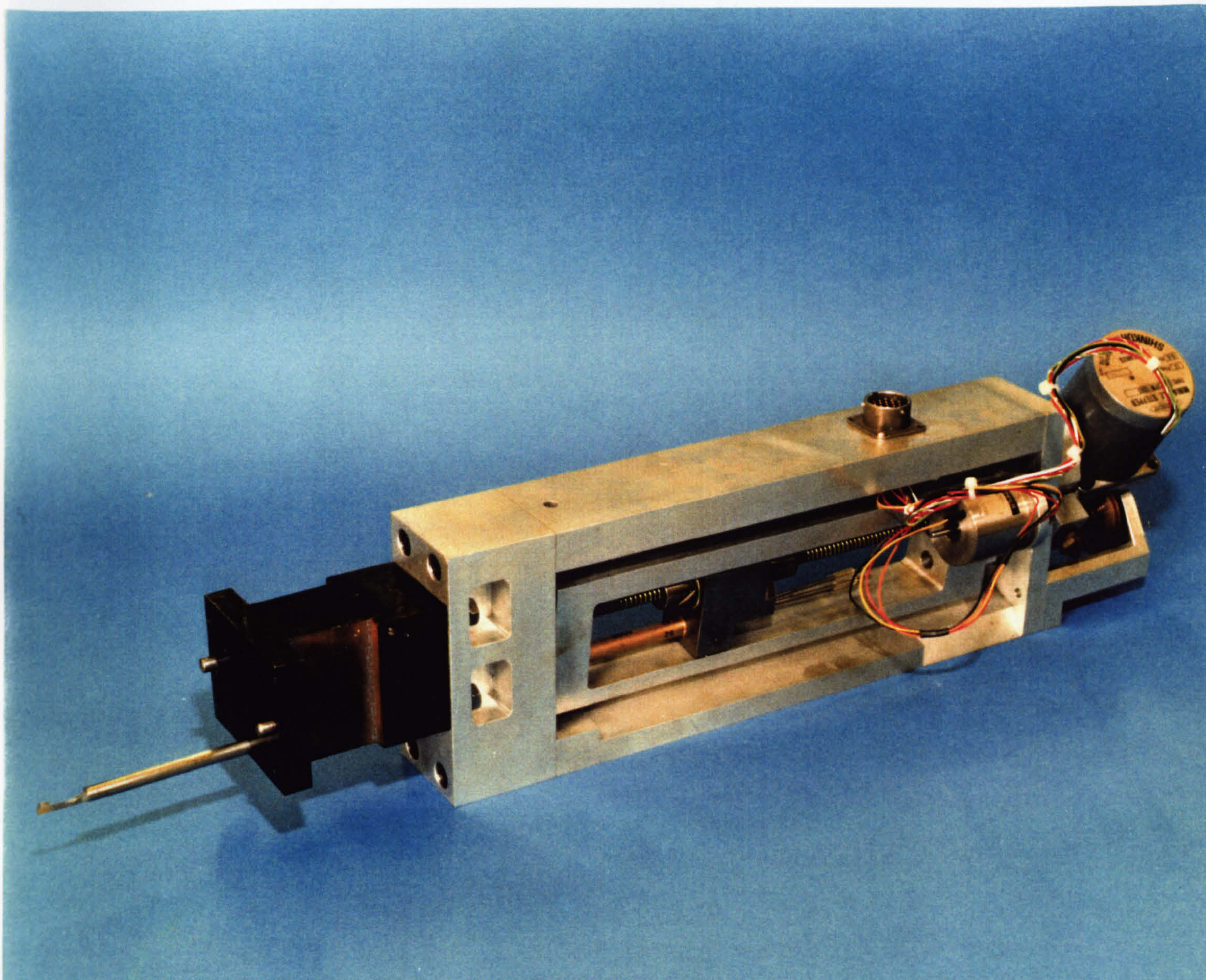


Fig 6.9

NO. 9 RIG WEDGE PROBE CALIBRATIONS

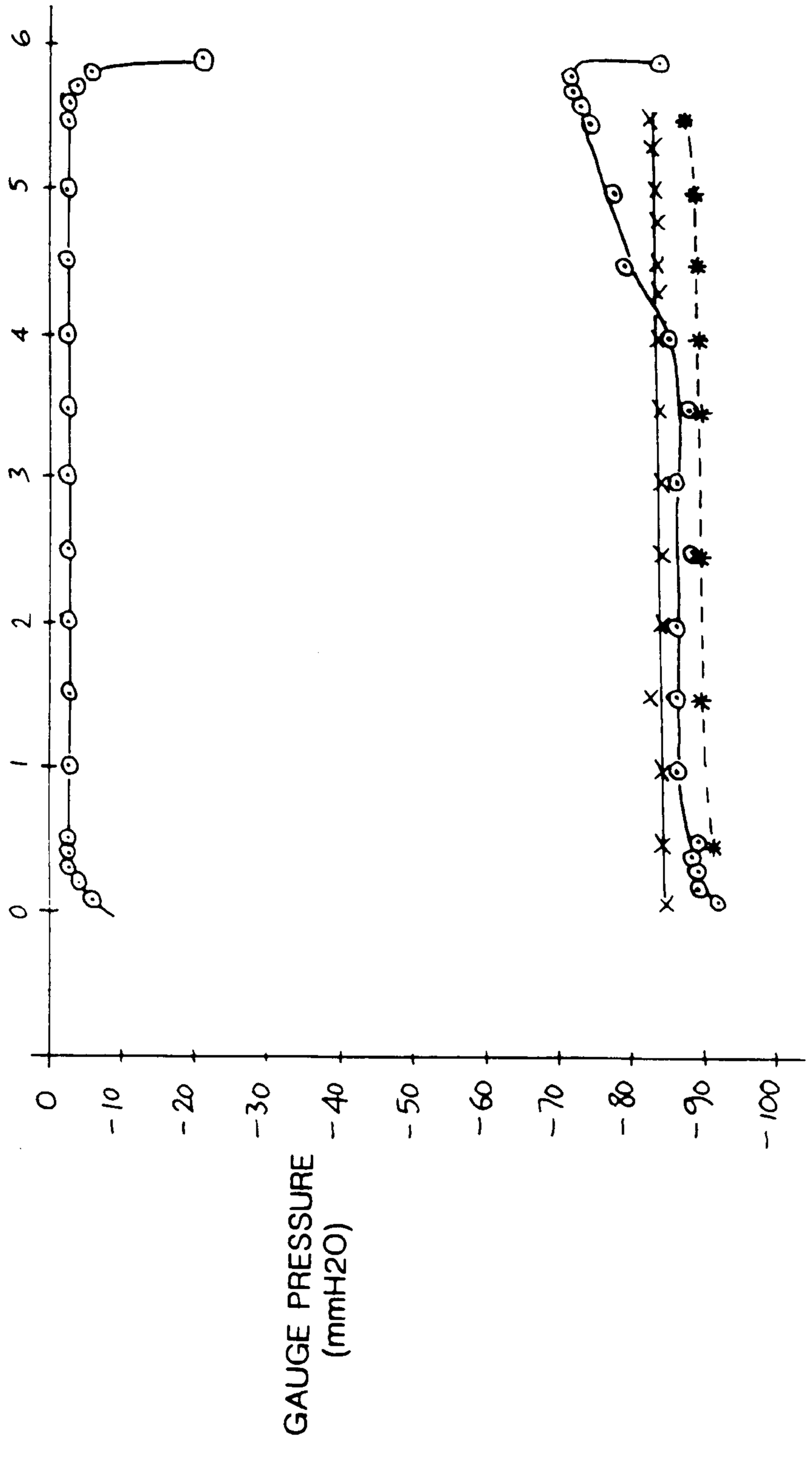
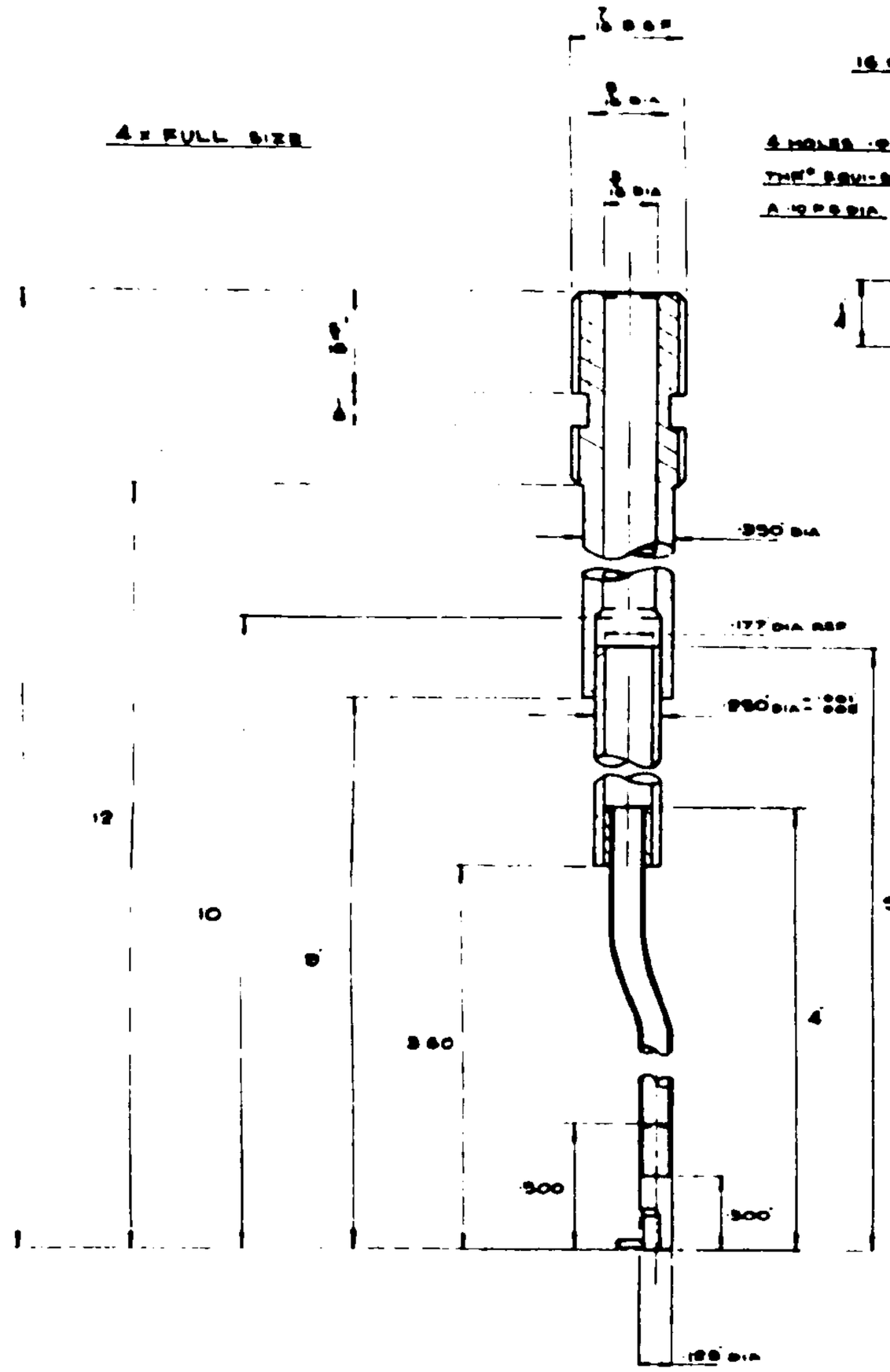


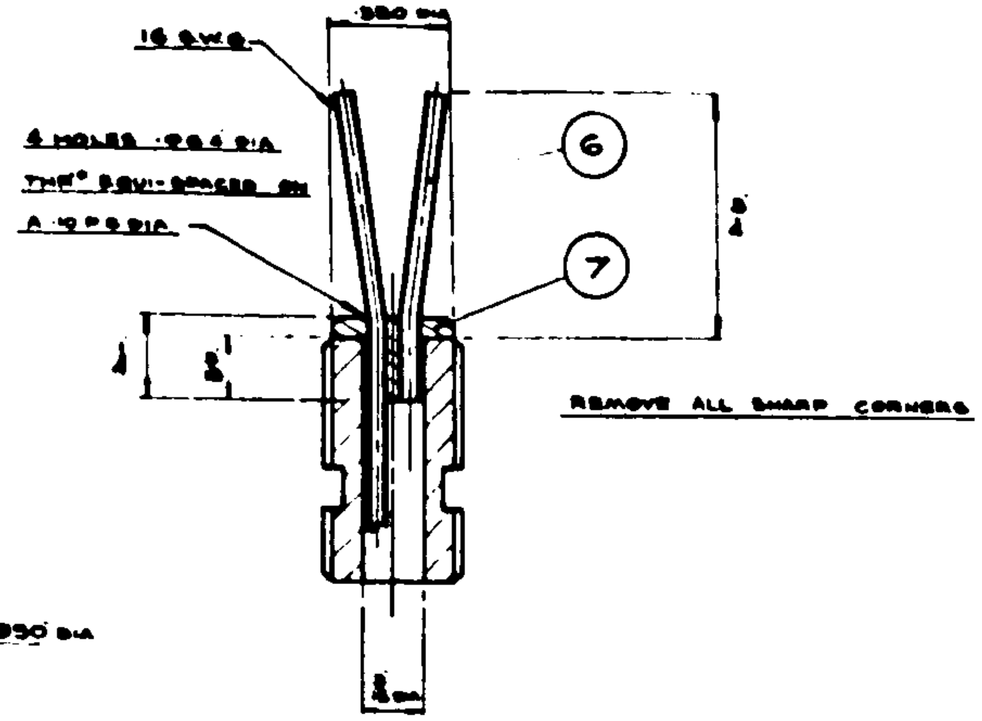
Fig 6.10

LSRC PNEUMATIC TRAVERSE INSTRUMENTS

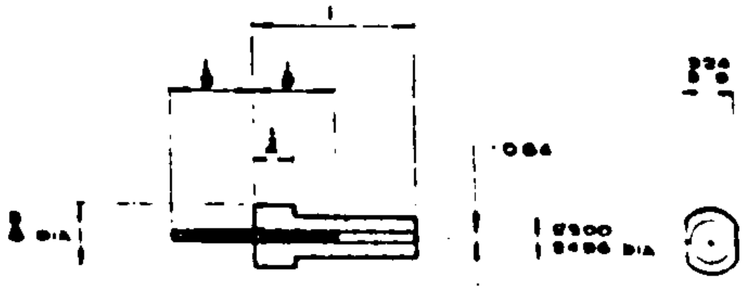
Fig 6.11 TOP TO BOTTOM : E WEDGE, COBRA, NASA WEDGE

4 × FULL SIZE



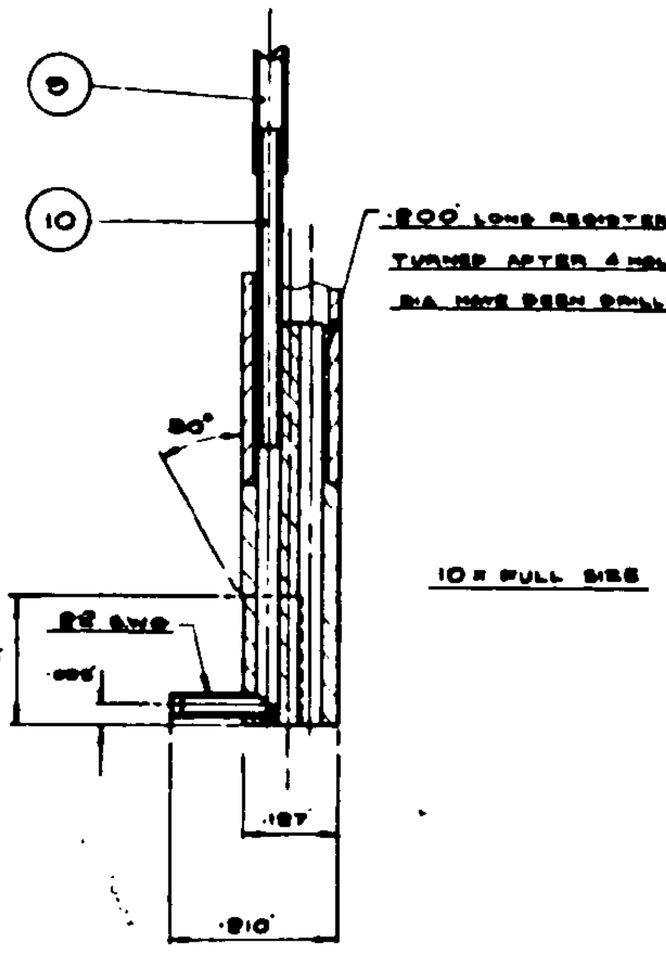


REMOVE ALL SHARP CORNERS



(123) STATIC TAP ·40 ·088

– MAT'L BRASS AND HYPODERMIC TUBE

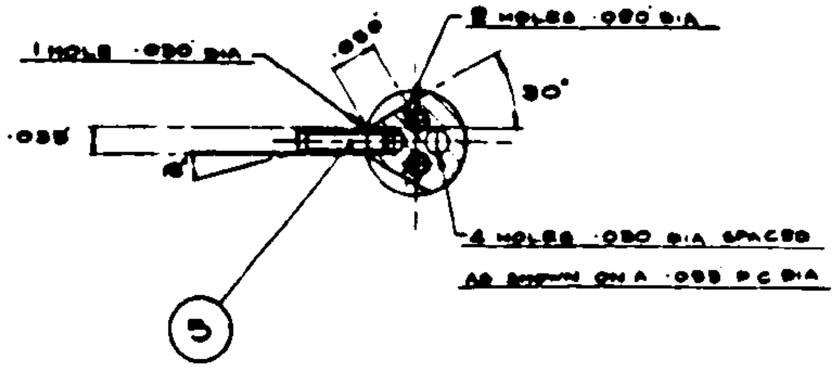


10 × FULL SIZE

FULL SIZE VIEW

(1)
(2)
(3)
(4)

(124) YAW PROBE 9·088 COMPLETE



ITEM	PART No.	DESCRIPTION	No. OFF	MAT.	SPEC.	REMARKS
10		HYPER TUBE	1	BRASS		
9		HYPER TUBE	1	BRASS		
8						
7		TUBE SUPPORT		BRASS		
6		HYPER TUBE		BRASS		
5		MAIN ENTRY TUBE	1	BRASS		
4		PROBE END	1	BRASS		
3		ENTRY/EXIT TUBE	1	BRASS		
2		PILOT TUBE	1	BRASS		
1		BODY TUBE	1	BRASS		

THIRD ANGLE PROJECTION

GENERAL TOLERANCE ON DIMENSIONS
MACHINED
UNMACHINED
OTHER DIMENSIONS AS STATED
WELD WHERE SHOWN THUS
MACHINE WHERE SHOWN THUS

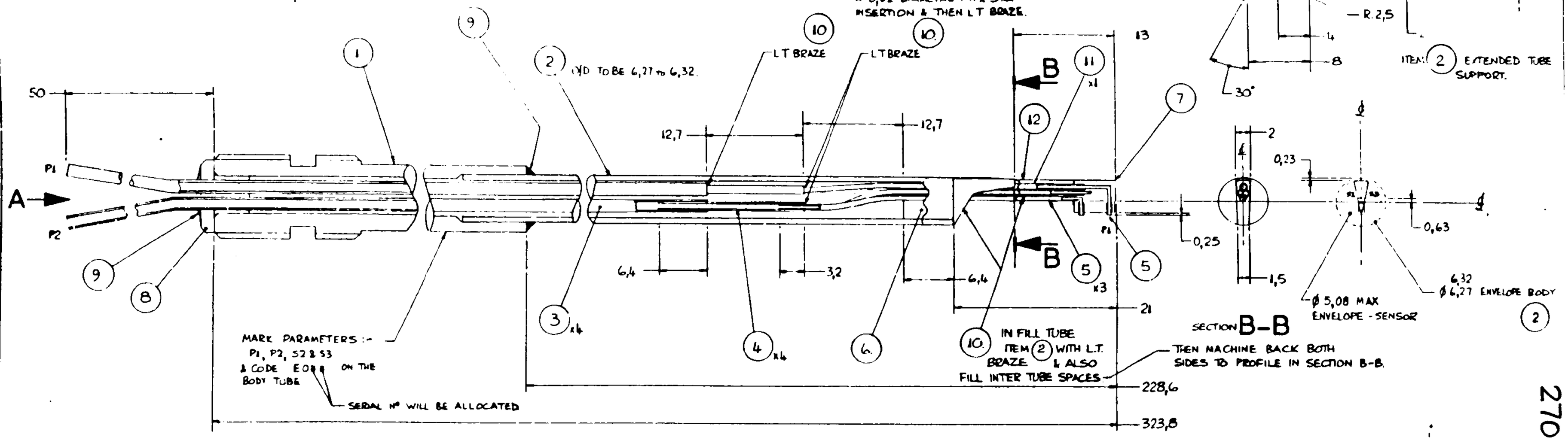
JOB No. | No. OF DETAILS | SCALE | FINISH | DRAWN | CHK'D | APP'D | ISSUE No. | TITLE

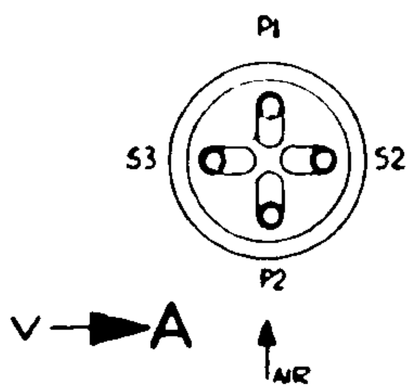
ISSUED BY
CRANFIELD INSTITUTE OF TECHNOLOGY
CRANFIELD

DRAWING No.
PA 40377
SHT 4 OF

Fig 6.12 CIT NASA WEDGE

REASON FOR ISSUE 2 CHANGE
TO STRENGTHEN THE WEDGE COLLECTOR TUBES
REASON FOR ISSUE 3 CHANGE
TO IMPROVE THE AERODYNAMICS OF THE STEM





CONSTRUCTION —

GENERAL CONSTRUCTION ASSEMBLY TO BE BY L.T BRAZE TO RPS254 THROUGHOUT EXCEPT THE BODY TUBE ITEM (1) TO ITEMS (2) & (8) TO BE 'COMSOL' SOLDERED.

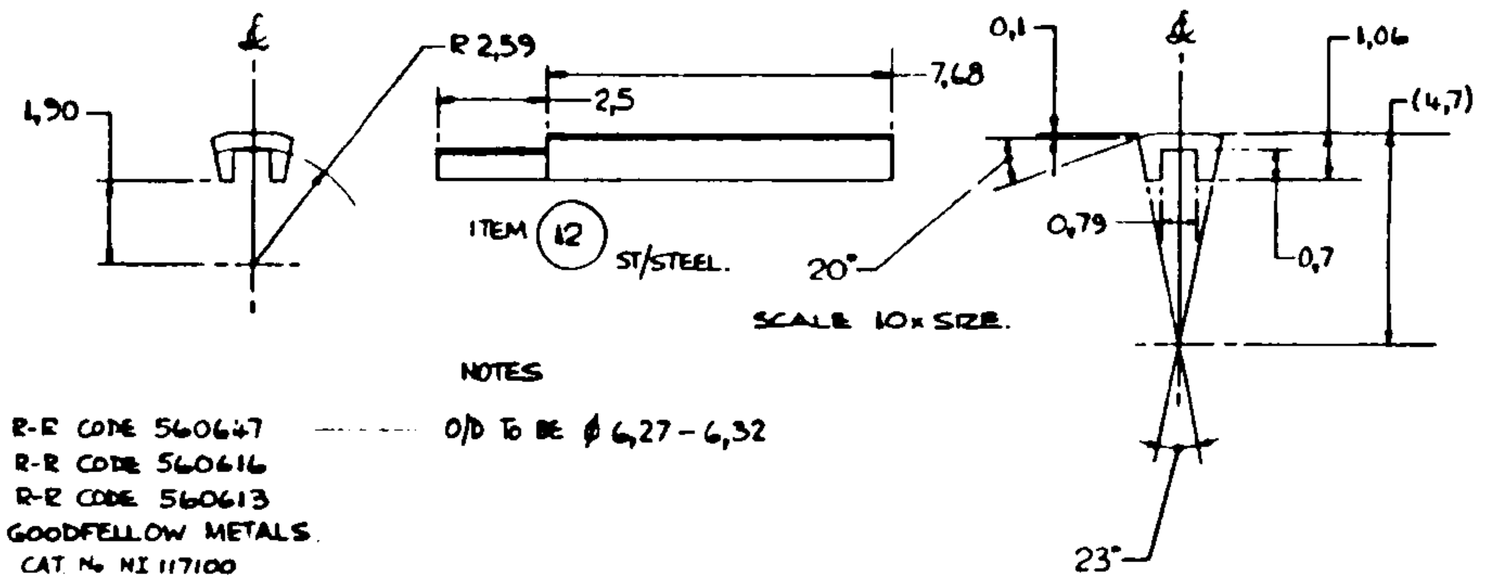
ENSURE THAT THE TUBE BORES ARE FREE OF OBSTRUCTION

ITEM	DESCRIPTION	
1.	BODY TUBE EX CRANFIELD.	
2	ST ST TUBE 6,35 O/D x 5,21 I/D	R-R CODE 560647
3	ST. ST. TUBE 1,65 O/D x 1,20 I/D	R-R CODE 560616
4	ST ST TUBE 1,10 O/D x 0,70 I/D	R-R CODE 560613
5	SPECIAL TUBE 0,6 O/D x 0,4 I/D - MONEL 400.	GOODFELLOW METALS. CAT Nº NI 117100
6	SPACER FOR Ø0,6 TUBES	BRASS CZ121 M or CZ121 BS2874 (Ex. BS249)
7	WEDGE SENSING HEAD	DRG. EIG 22276
8	TUBE SUPPORT Ex. CRANFIELD.	
9	SOLDER "COMSOL"	
10	SILVERFLO 55	
11	ST. ST. TUBE 0,7 O/D x 0,4 I/D	R-R CODE 560610.
12	ST ST SUPPORT FROM Ø6,35 BAR	R-R CODE 7T40250.

CRANFIELD DRG PA40977 SHT 48 REFERS.
R-R. MEMO RED/CRBM 8/KR 7/3/1984

NOTES

O/D TO BE Ø 6,27 – 6,32



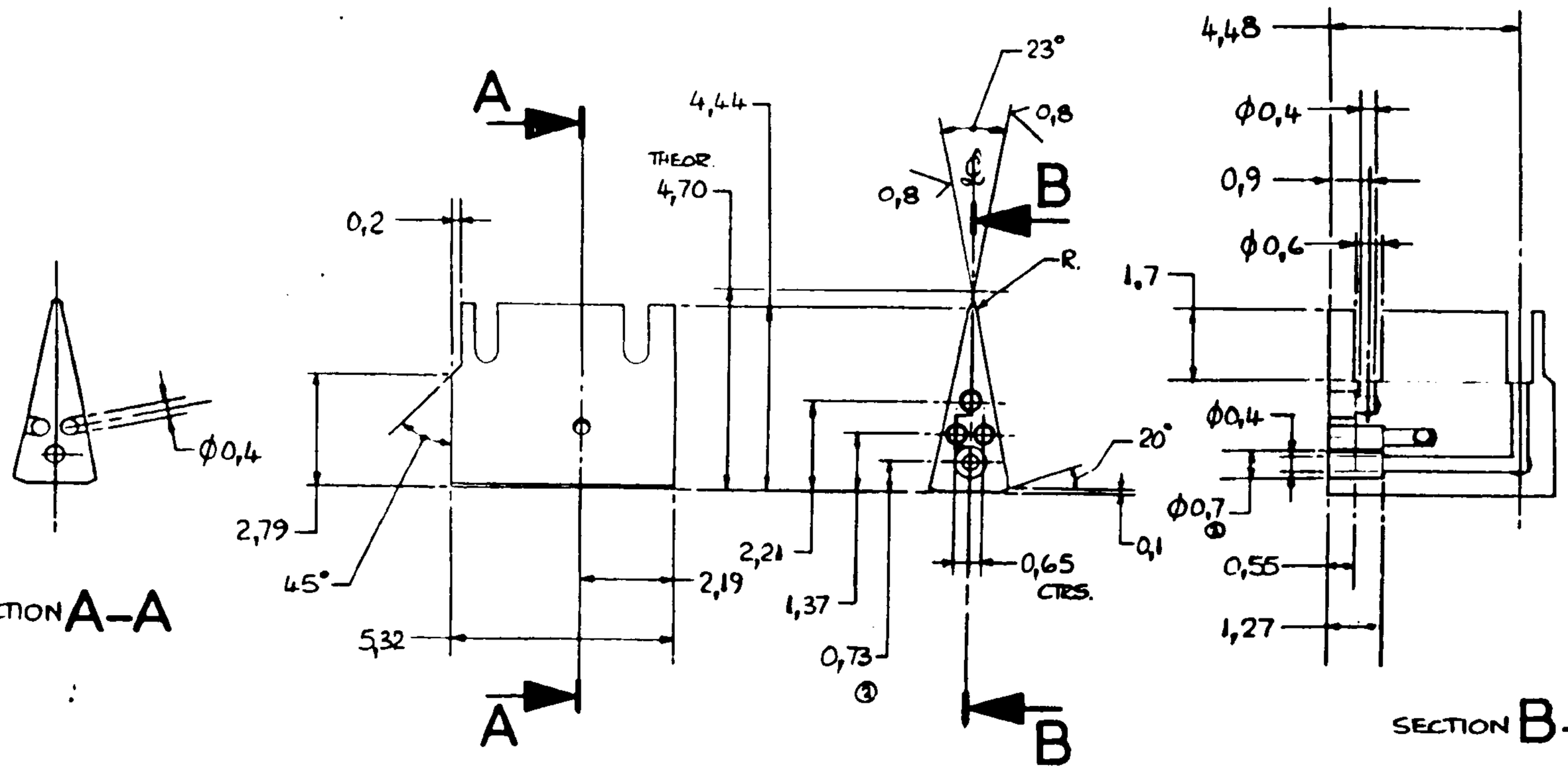
ISSUE 3

SCALE 4 x SIZE UOS	L.O.P. No EIG22276	MATL. CODE	SEE DESN.	DRAWN	RK
		SPEC. No.		CHECKED	PROBE ONE
		HARDNESS		DATE	
		HEAT TREAT		APPROVED	
WEDGE PROBE – CRANFIELD.		ROLLS-ROYCE LIMITED		SHEET 1 OF 1 SHEETS	
© Rolls-Royce Limited 1984. This document is the property of Rolls-Royce Ltd and may not be copied or communicated to a third party or used for any purpose other than that for which it is supplied without the express written authority of Rolls-Royce Limited.		WEDGE PROBE – 4 HOLE TYPE E. R-R/CIT END-BEND PROGRAMME.		EIG22275	

Fig 6.13a CIT E WEDGE

3rd ANGLE PROJECTION

SIZE - FULL.



SECTION A–A

SECTION B–B

MATERIAL :–
BRASS CZ121M OR CZ121
TO BS2874. (Ex. BS249)

FINISH :–
NATURAL.

ISS. 2.

CIT E WEDGE

HEAD DETAIL

DESIGN USAGE :–
R-R/CIT END-BEND PROGRAMME

SCALE: 10 x SIZE	L.O.P. No. EIG22276	MATL. CODE	CZ121M OR CZ121	DRAWN	Nam/GHUS	ISSUE	RIG
MACHINE ARRANGEMENTS WHERE MARKED ✓		SPEC. No.	BS2874	CHECKED		SECTION	PROBE.
ALL DIMENSIONS AND TOLERANCES ARE IN M.M.'S		HARDNESS	80-150 HV.	DATE	13/3/1974	No. OFF	ONE
		HEAT TREAT	—	APPROVAL			

WEDGE PROBE — CRANFIELD

ROLLS-ROYCE LIMITED

SHEET 1 OF 1 SHEETS

WEDGE SENSING HEAD
(4 HOLE TYPE).

EIG 22276

ALTN No.	Change Letter	ALTERATIONS	DATE
1		BACK HOLE O/D INCREASED FROM 0.6 TO 0.7 & FROM BACK FROM 0.71 TO 0.73.	2/4/1974

27/1

CIT E WEDGE PROBE CALIBRATIONS

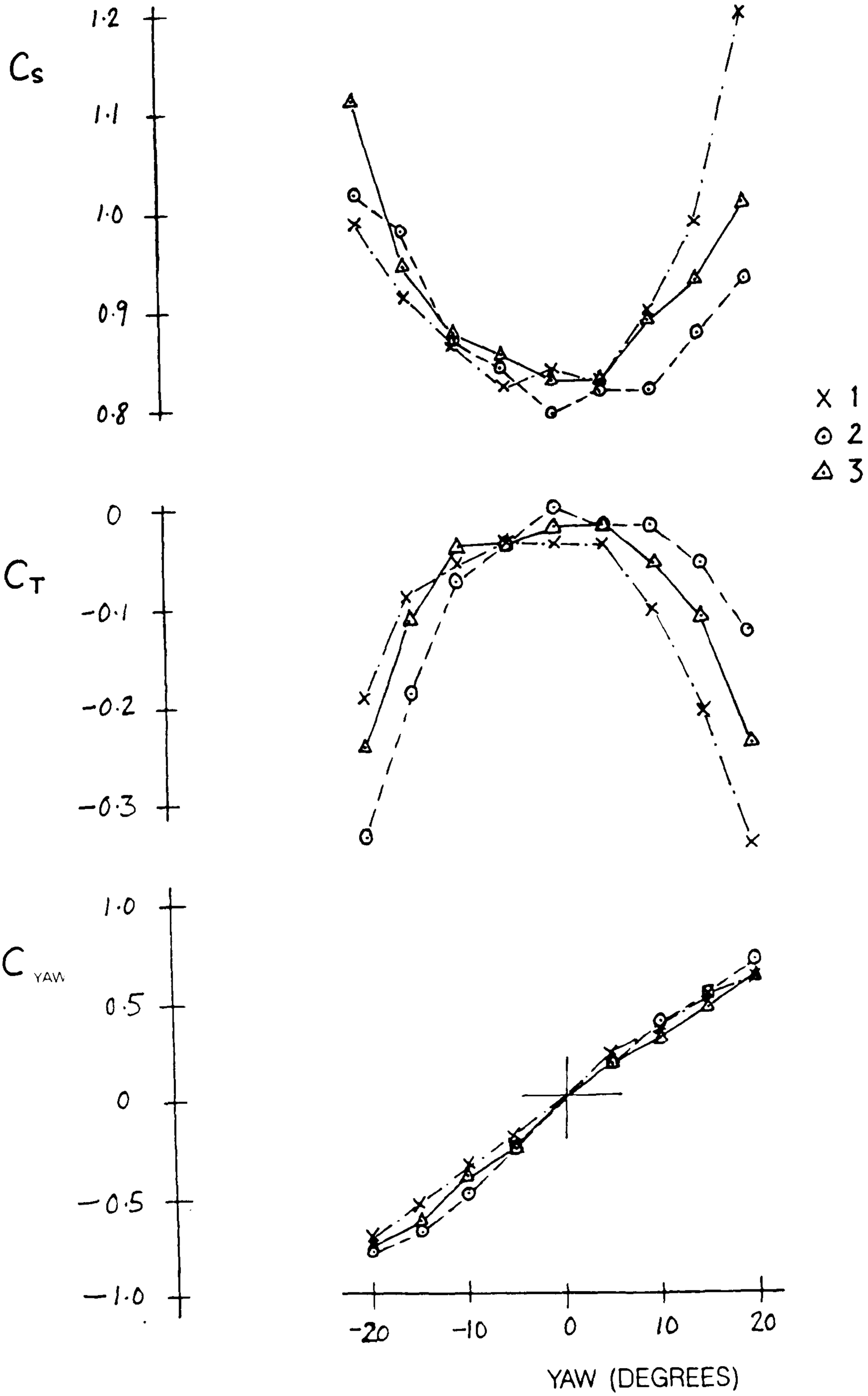
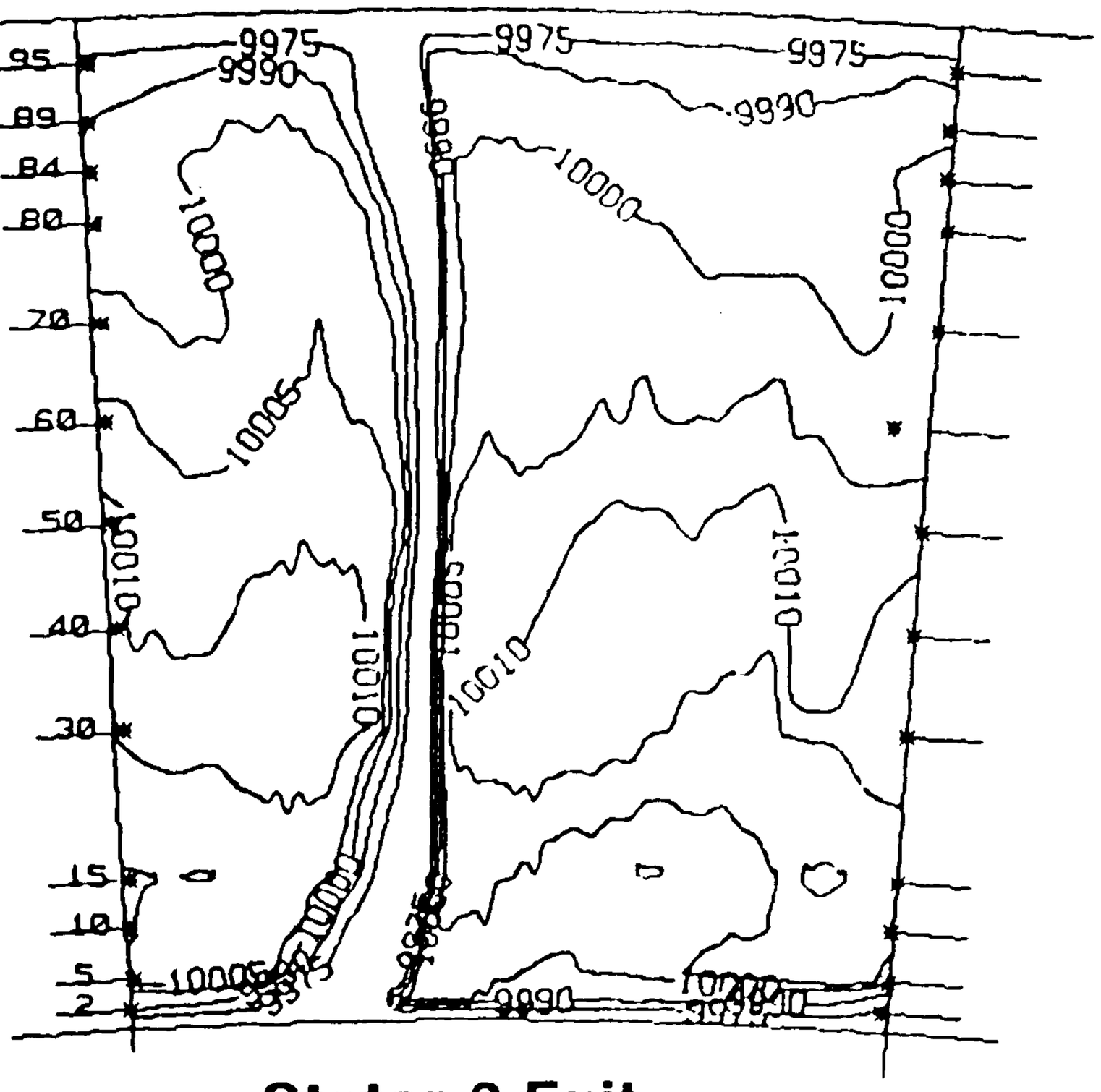


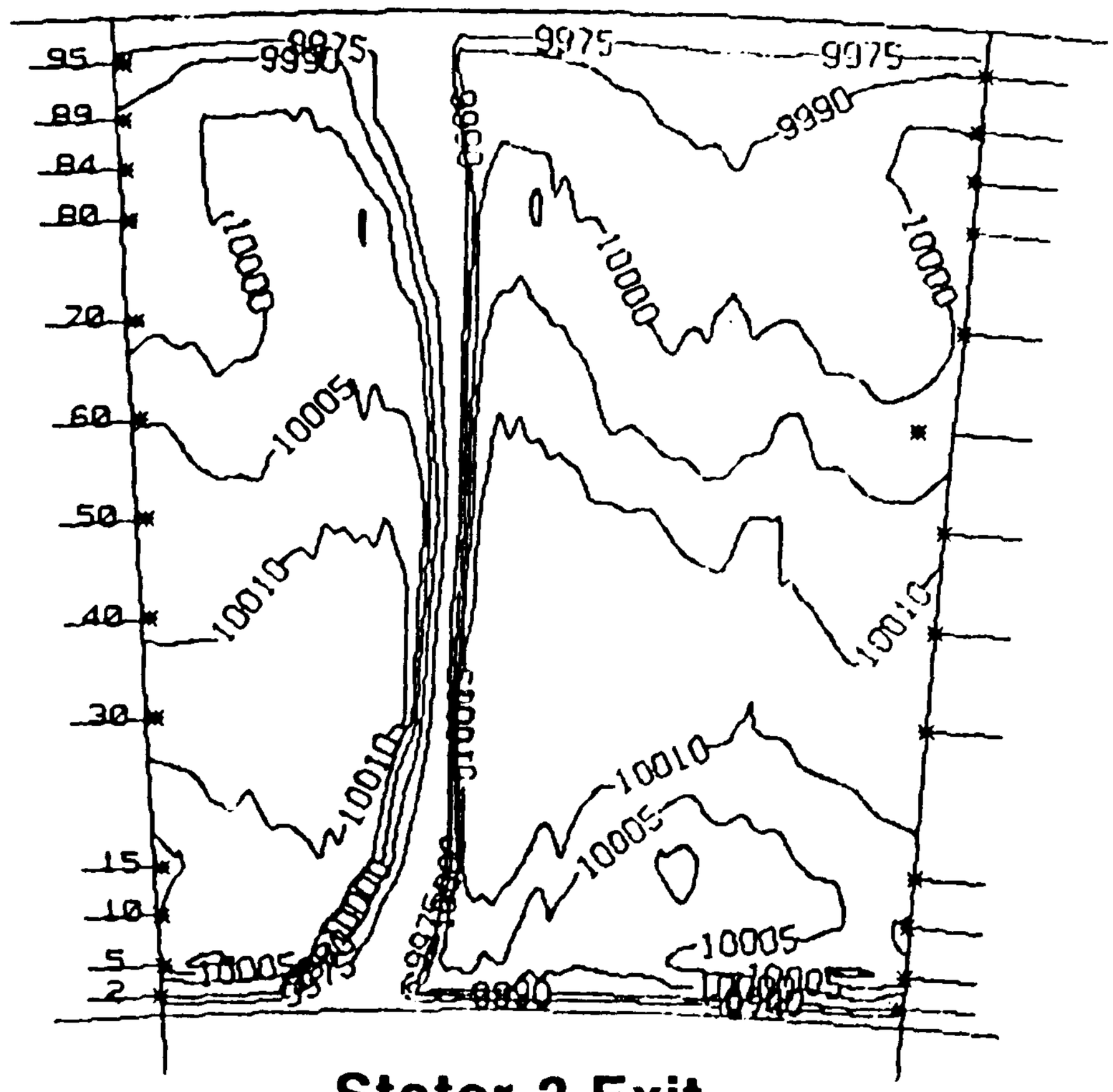
Fig 6.14

COMPARISON BETWEEN STUDY STAGE INLET AND EXIT CONDITIONS

DCA IEB, Peak Efficiency



Stator 2 Exit



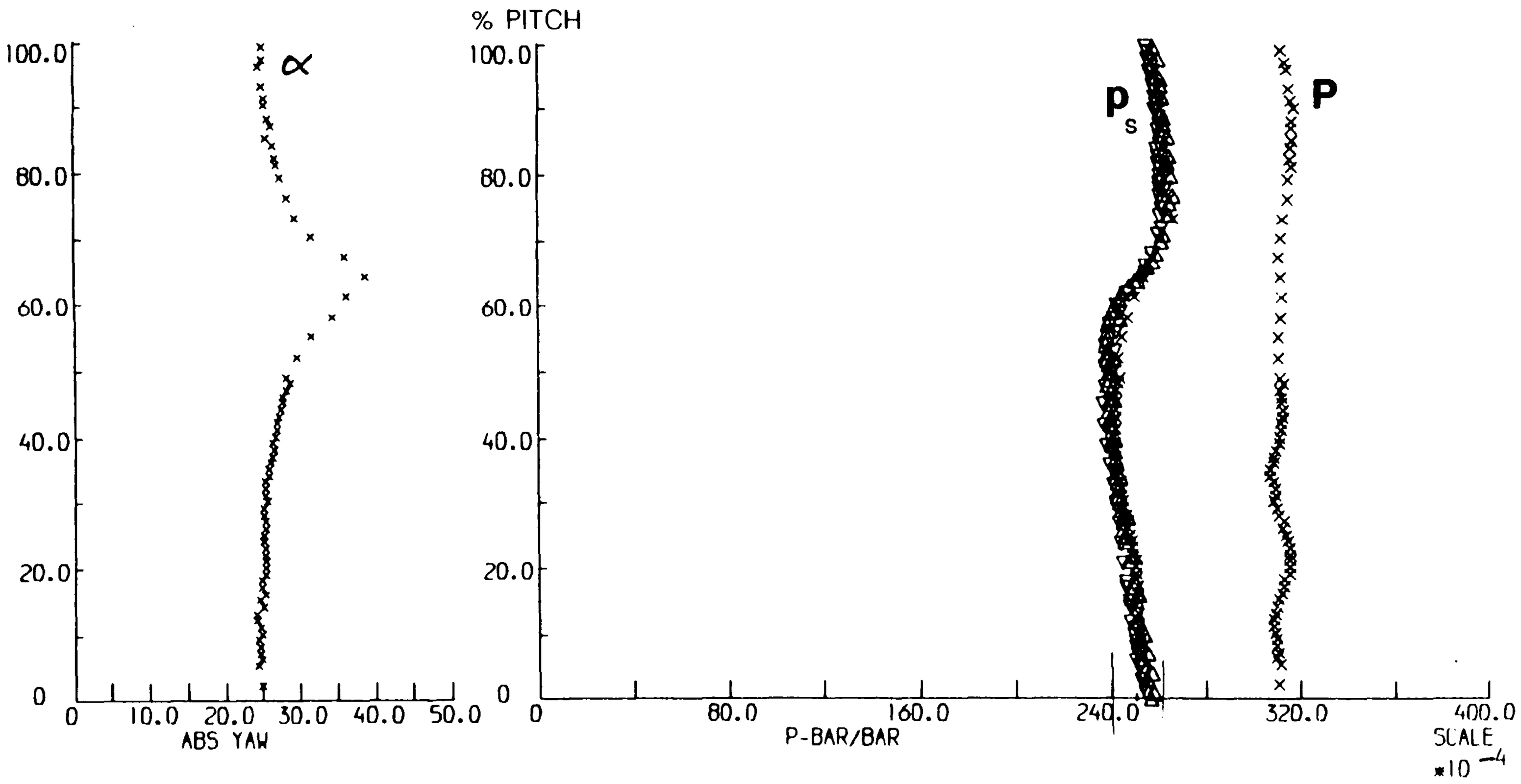
Stator 3 Exit

Fig 6.15

$P(r,\theta)/\bar{P} * 10000$

ROTOR 3 EXIT CIRCUMFERENTIAL SWEEP

DCA Datum Peak Efficiency 70% Height



Port and Starboard Wall Statics Shown With Probe Values

Fig 6.16

STATOR 2 AND STATOR 3 EXIT CIRCUMFERENTIAL SWEEPS

DCA Datum Peak Efficiency 70% Height

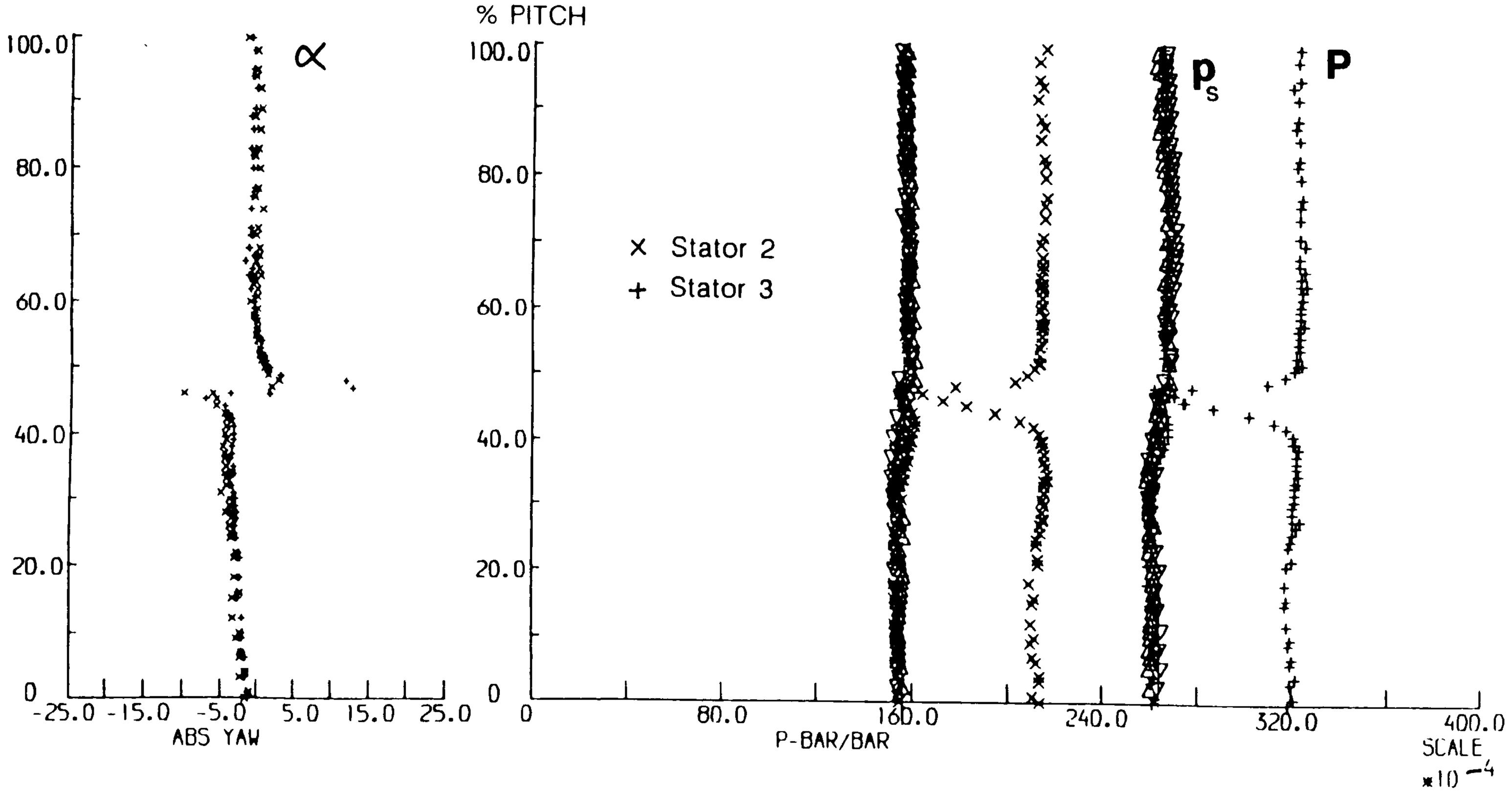
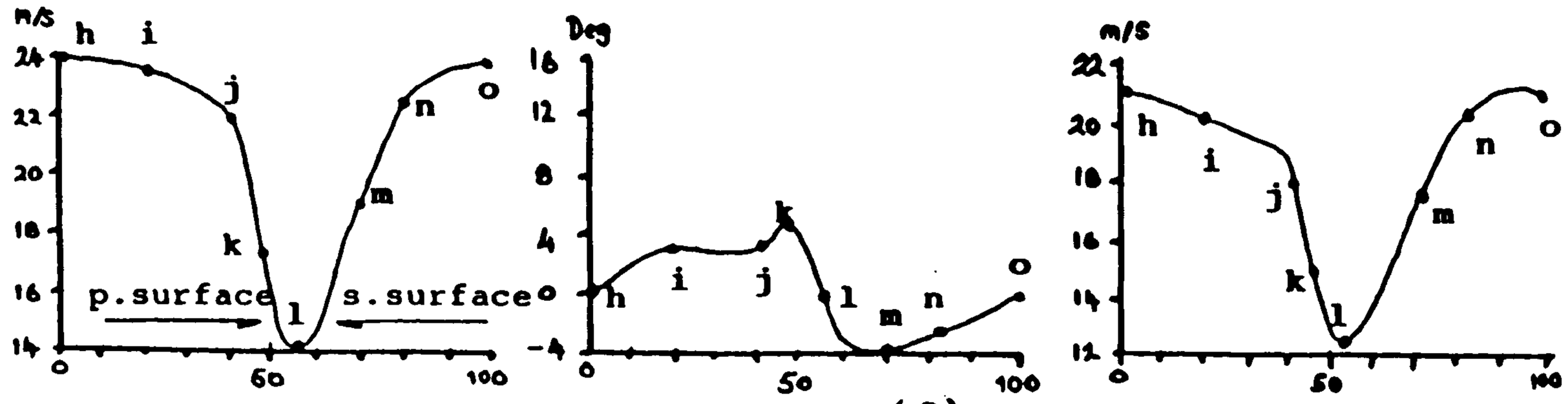


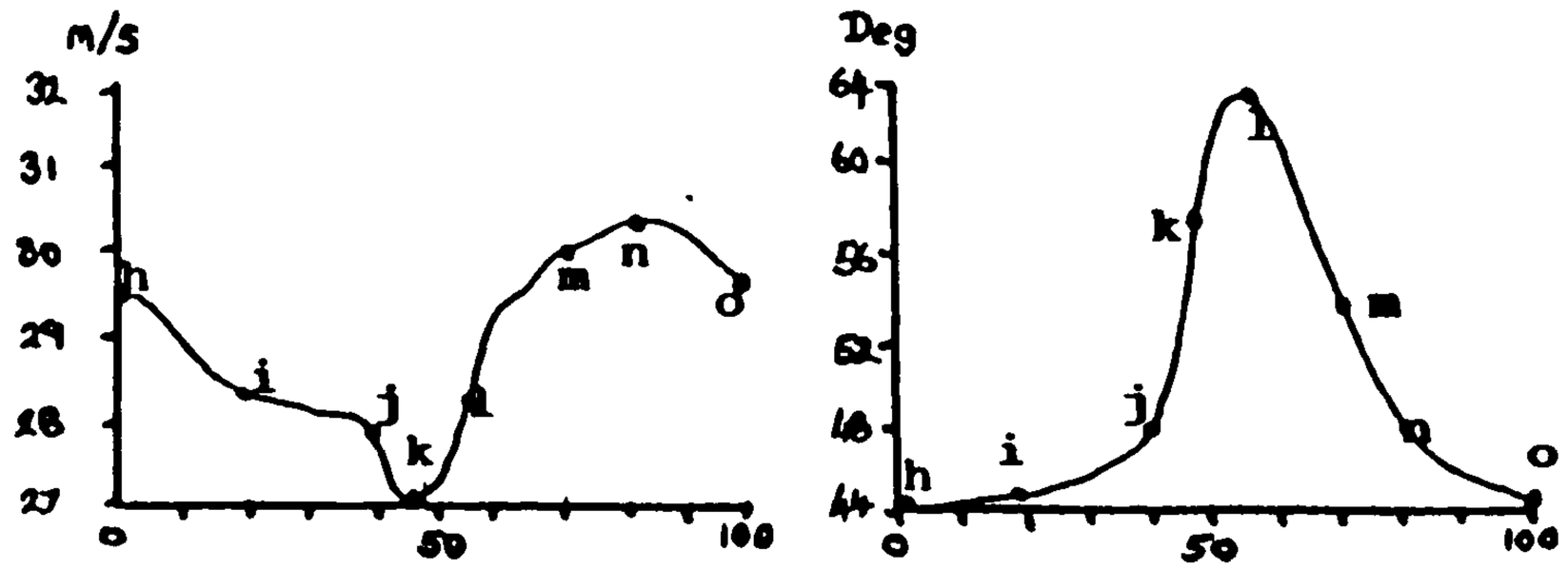
Fig 6.17 Port and Starboard Wall Statics Shown With Probe Values

HOT-WIRE MEASUREMENTS AT ROTOR EXIT

Data at 16% Height



a) Rel. Velocity. b) Rel. Angle. (β) c) Axial Velocity.



d) Abs. Velocity. e) Abs. Angle. (α)

Fig 6.18 **Hirsch and Kool ASME 76-GT-18**

MEAN STAGE CHARACTERISTICS

DCA DATUM

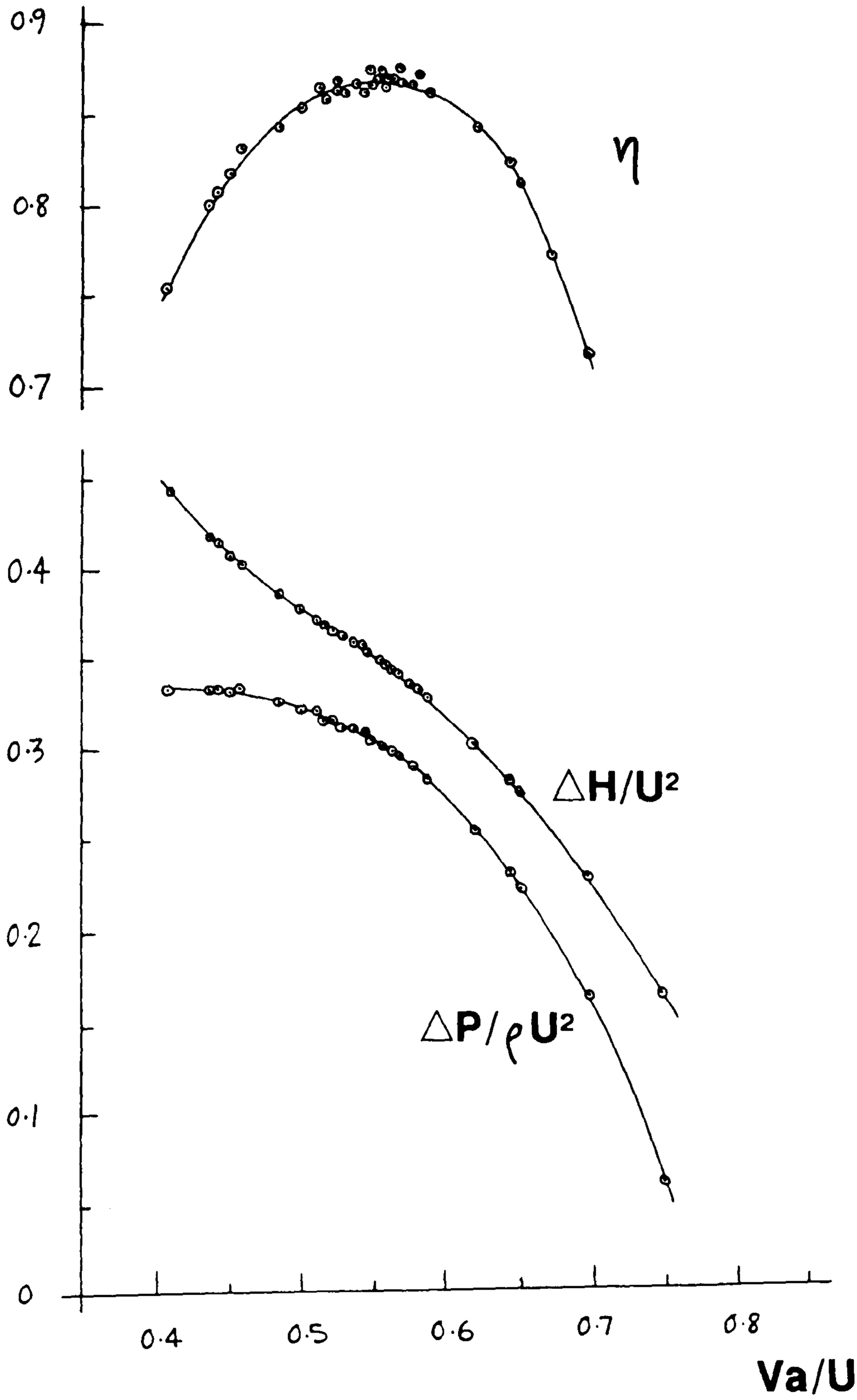
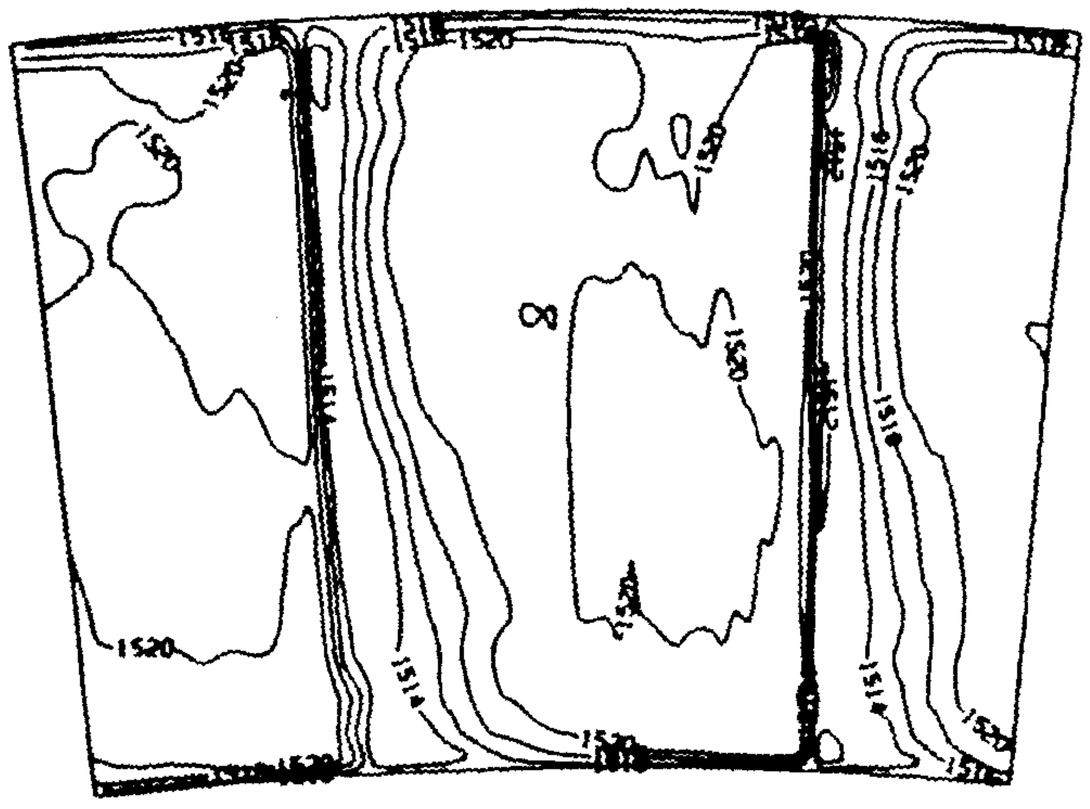


Fig 7.1

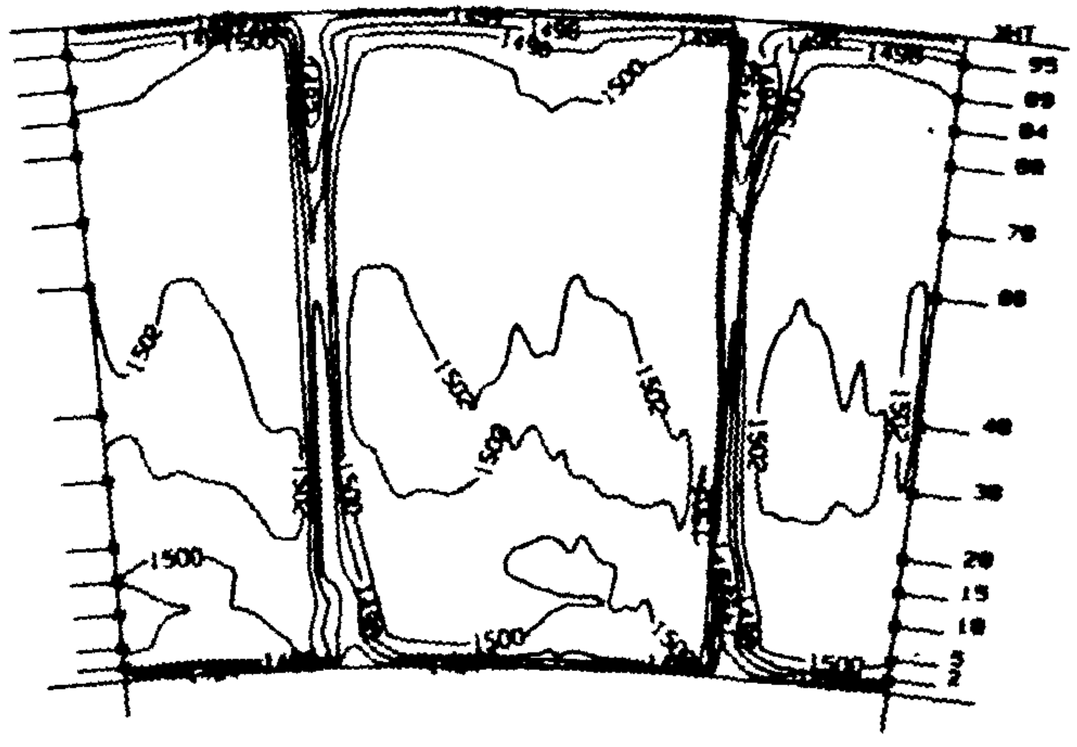
DCA DATUM : CONTOURS OF TOTAL PRESSURE

STATOR 3



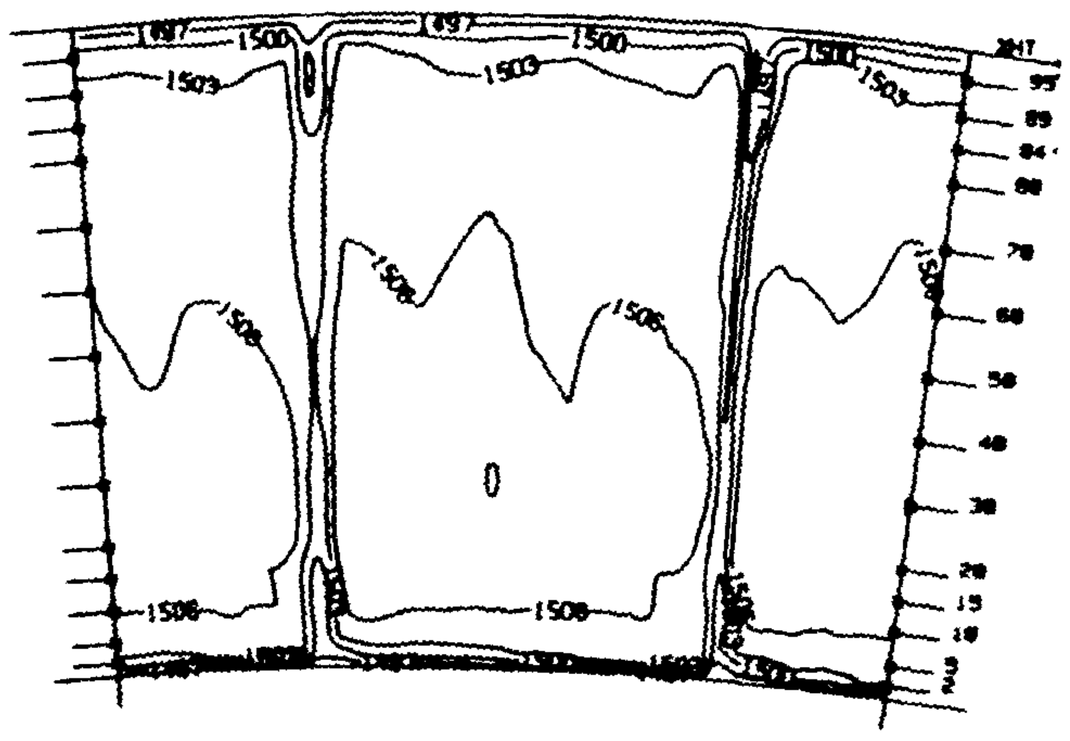
Near Stall

STATOR 2



Peak Efficiency

STATOR 3



High Flow

Fig 7.2

DCA DATUM : ROTOR GAS ANGLES

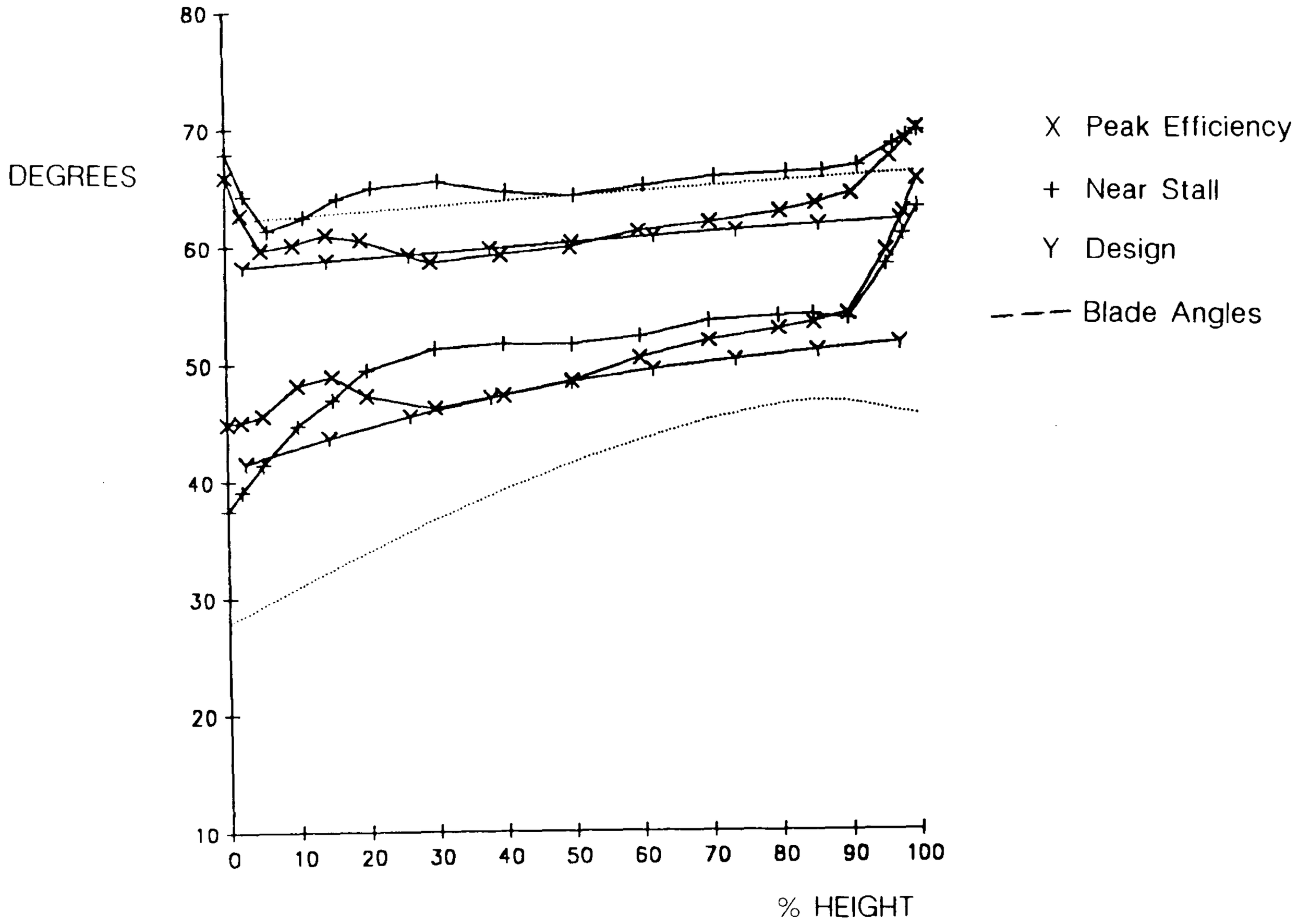


Fig 7.3

DCA DATUM : ROTOR LOSS COEFFICIENTS

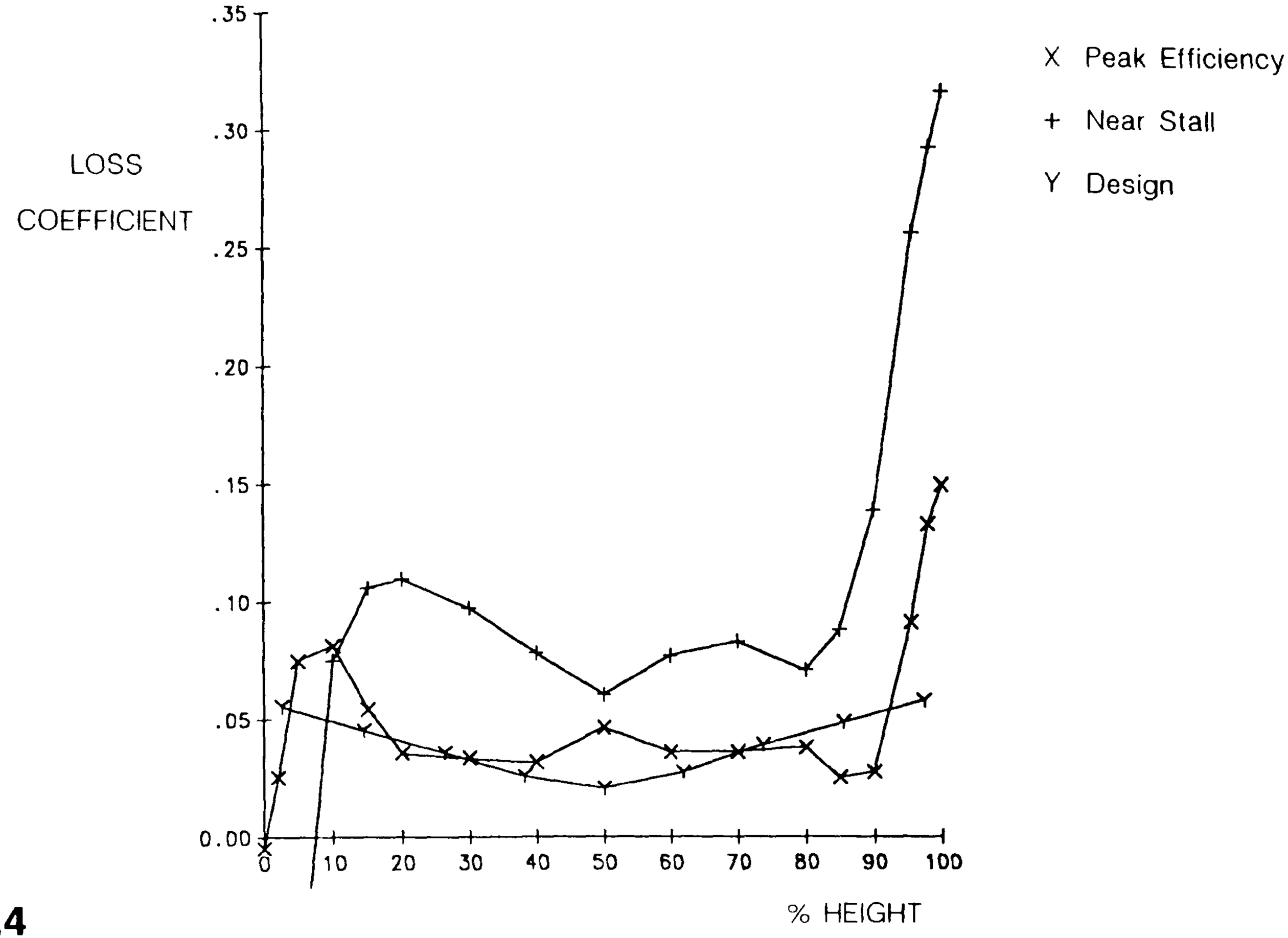


Fig 7.4

DCA DATUM : STATOR GAS ANGLES

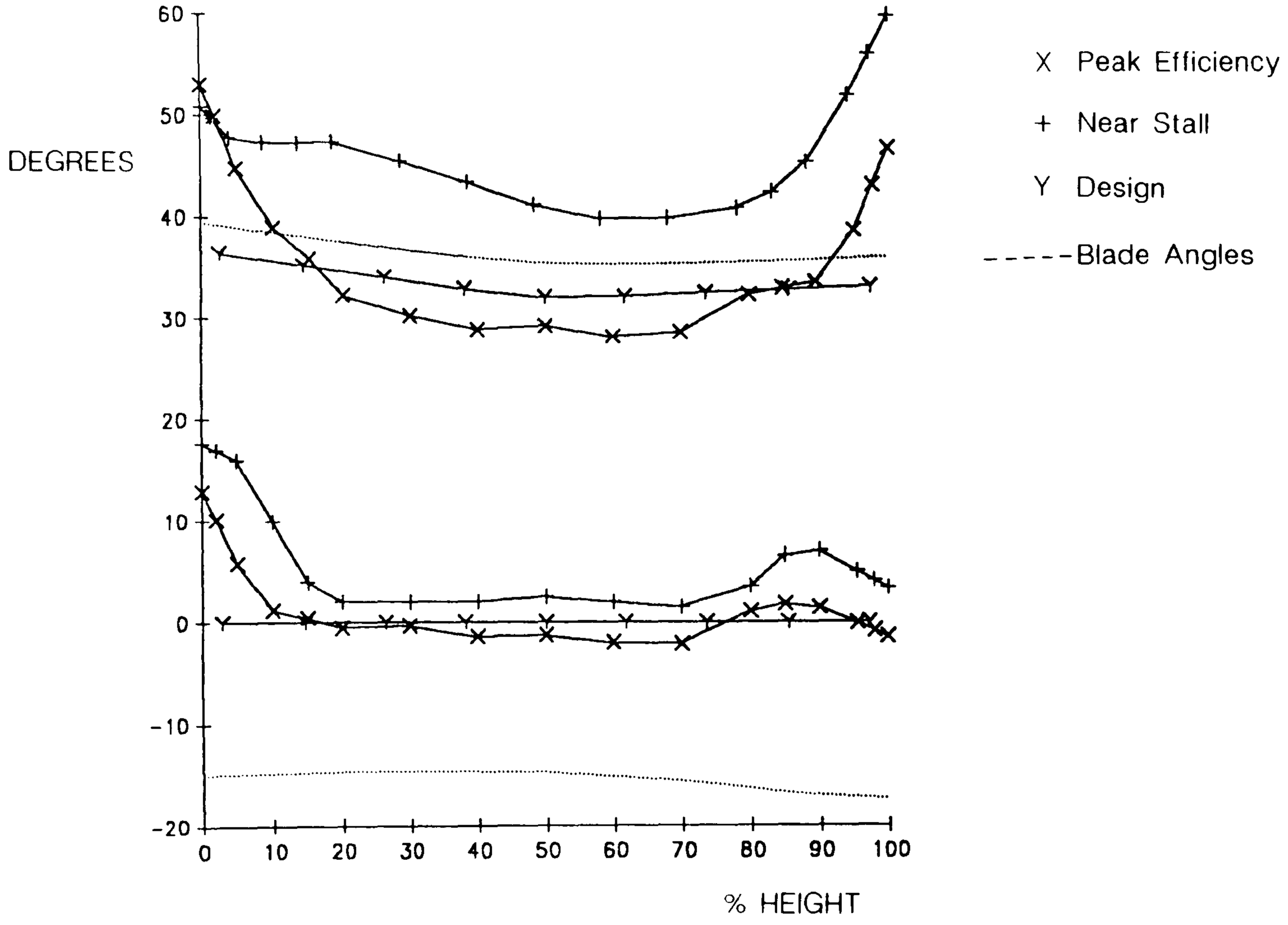


Fig 7.5

DCA DATUM : STATOR LOSS COEFFICIENTS

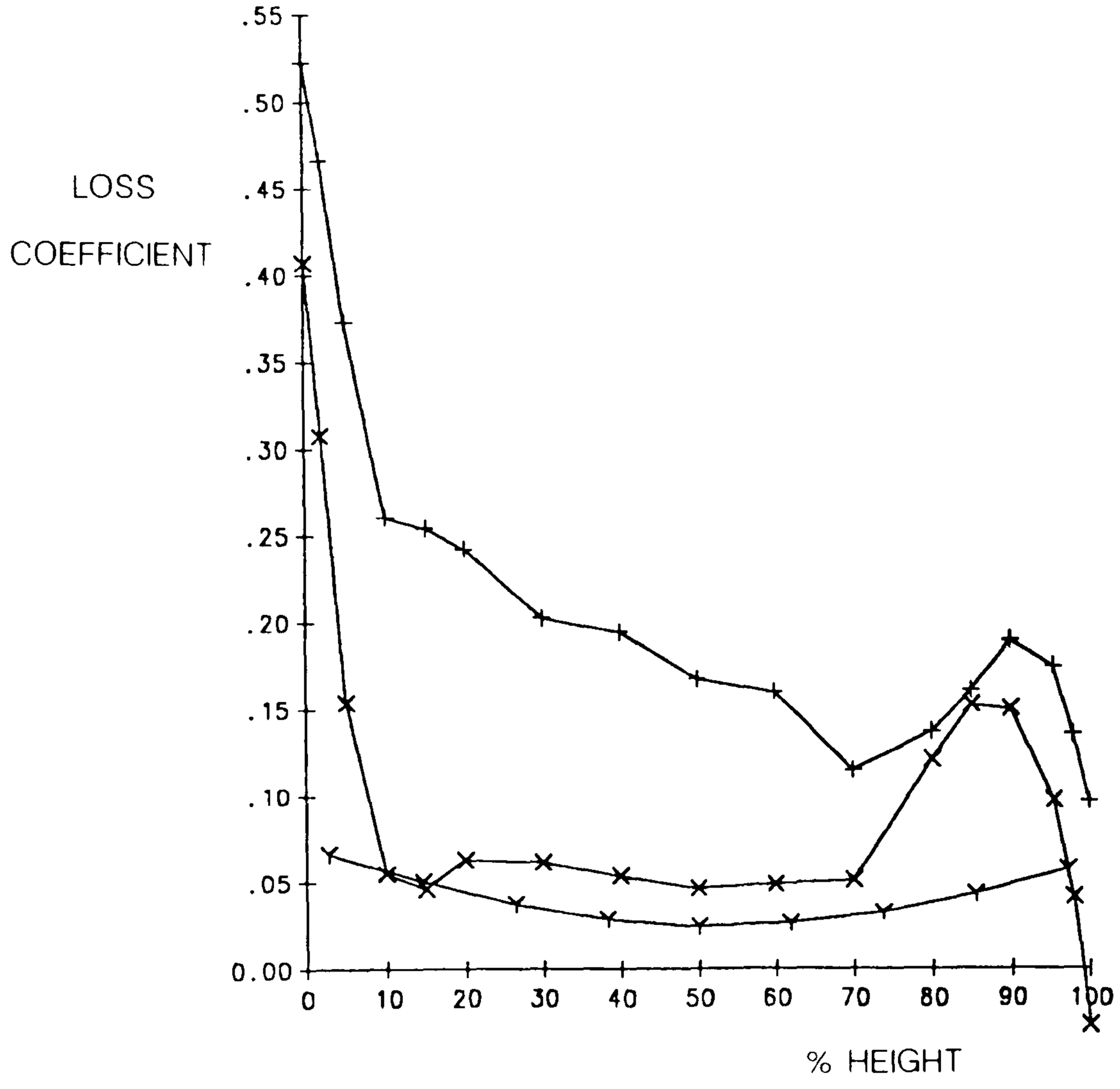
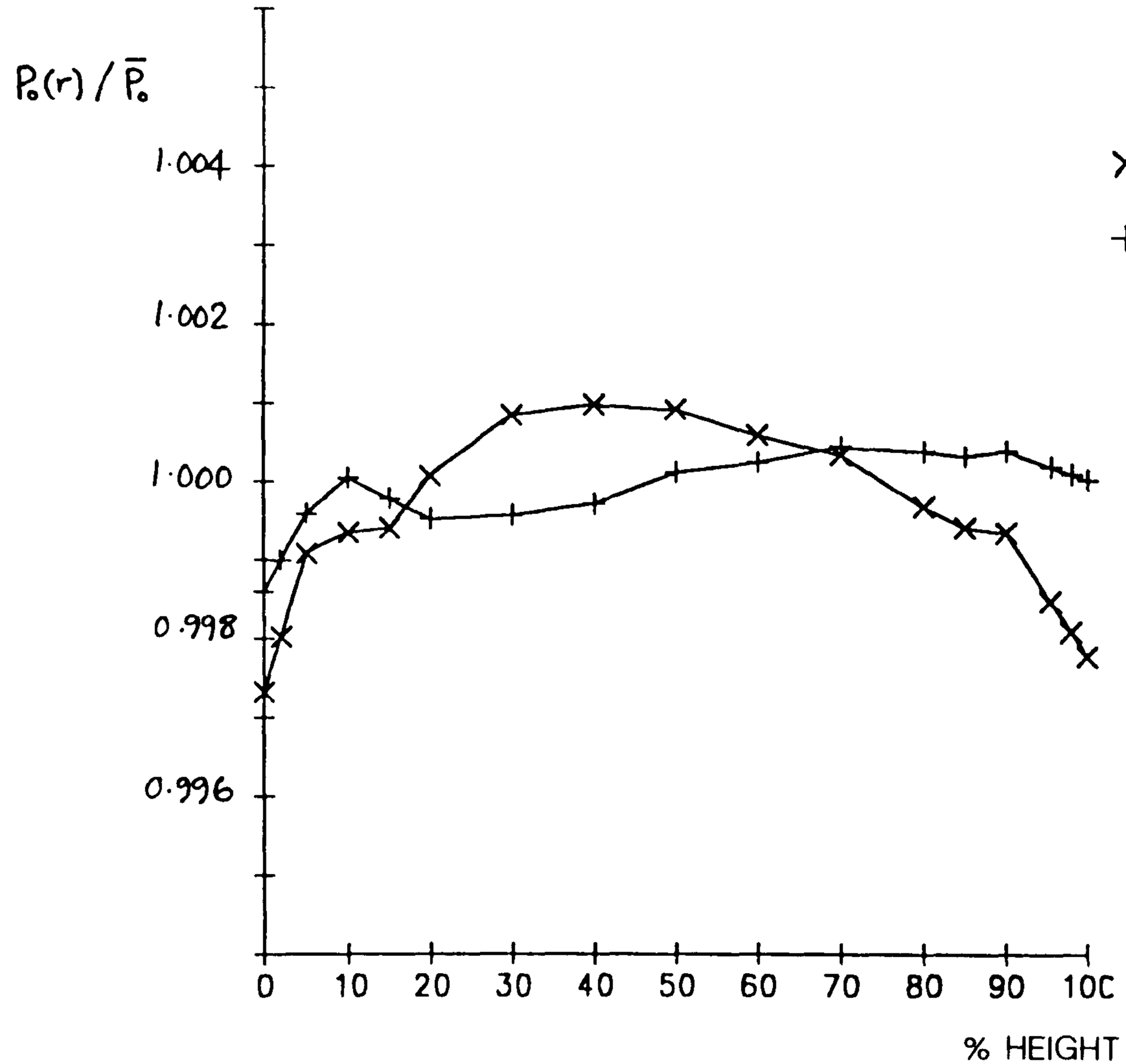


Fig 7.6

STAGE 3 EXIT CONDITIONS

DCA DATUM



283

Fig 7.7

MEAN STAGE CHARACTERISTICS

DCA DATUM AND IEB

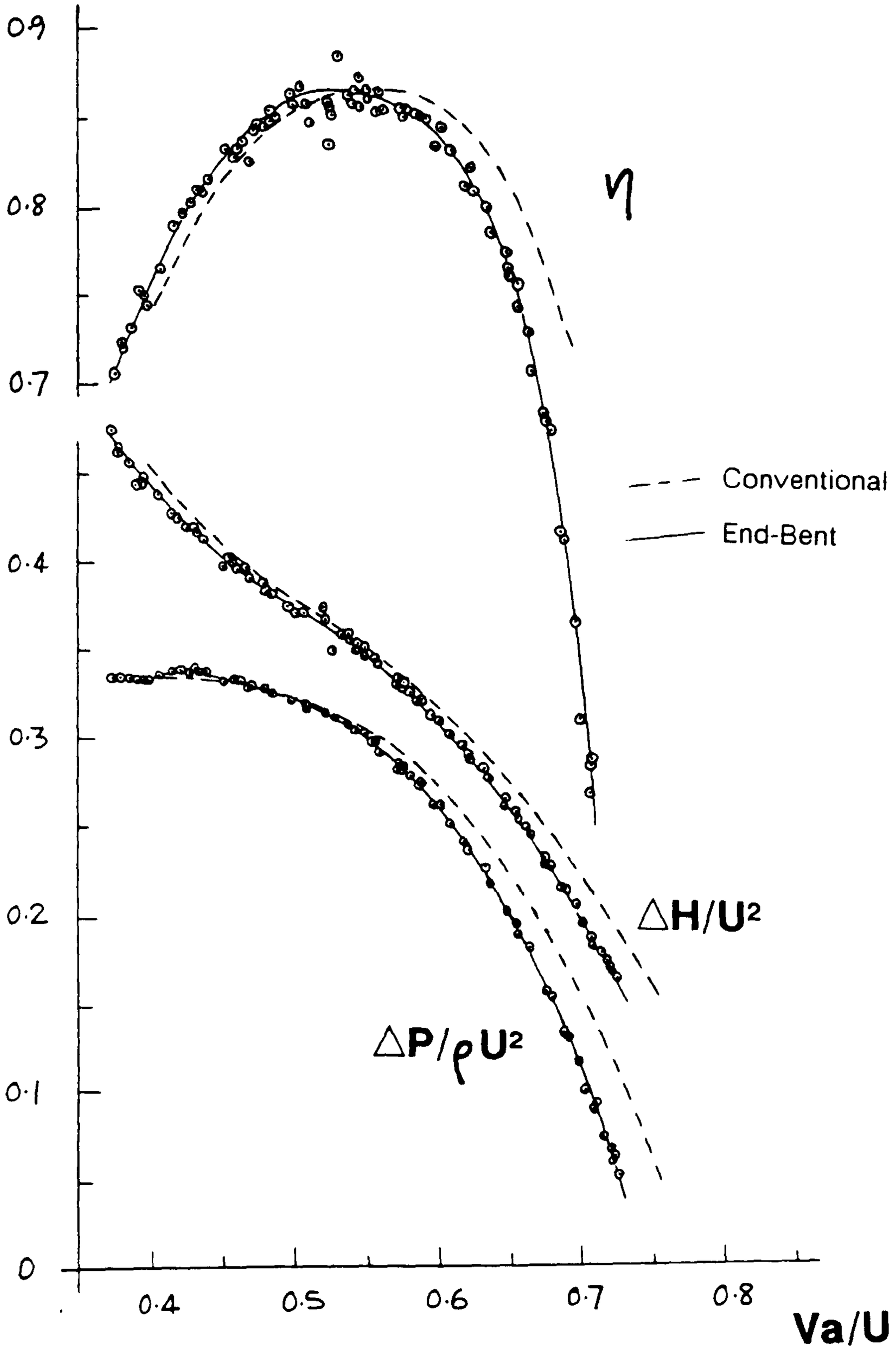
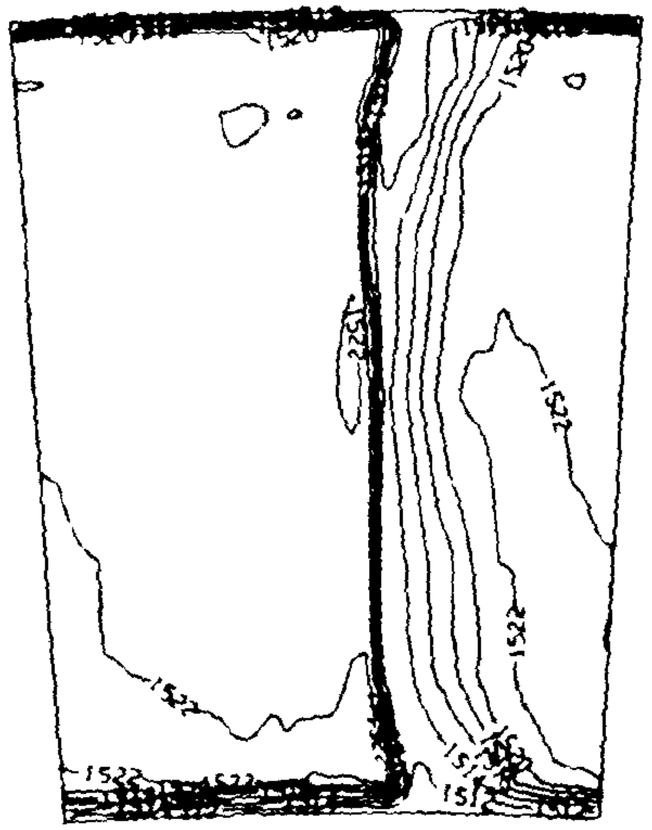


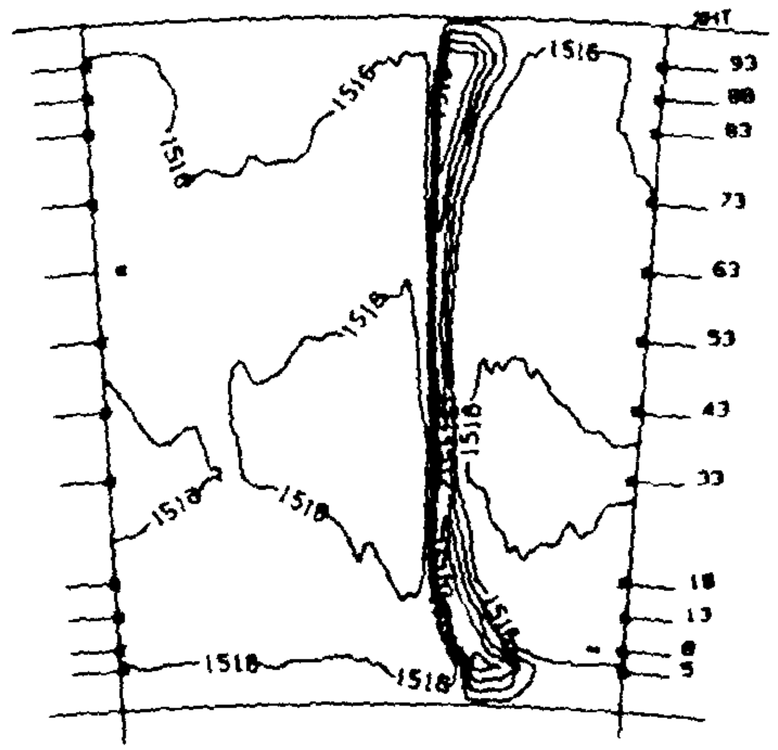
Fig 7.8

DCA IEB : CONTOURS OF TOTAL PRESSURE

Stator 3 Exit



Near Stall



Peak Efficiency

Fig 7.9

DCA DATUM AND IEB : ROTOR GAS ANGLES

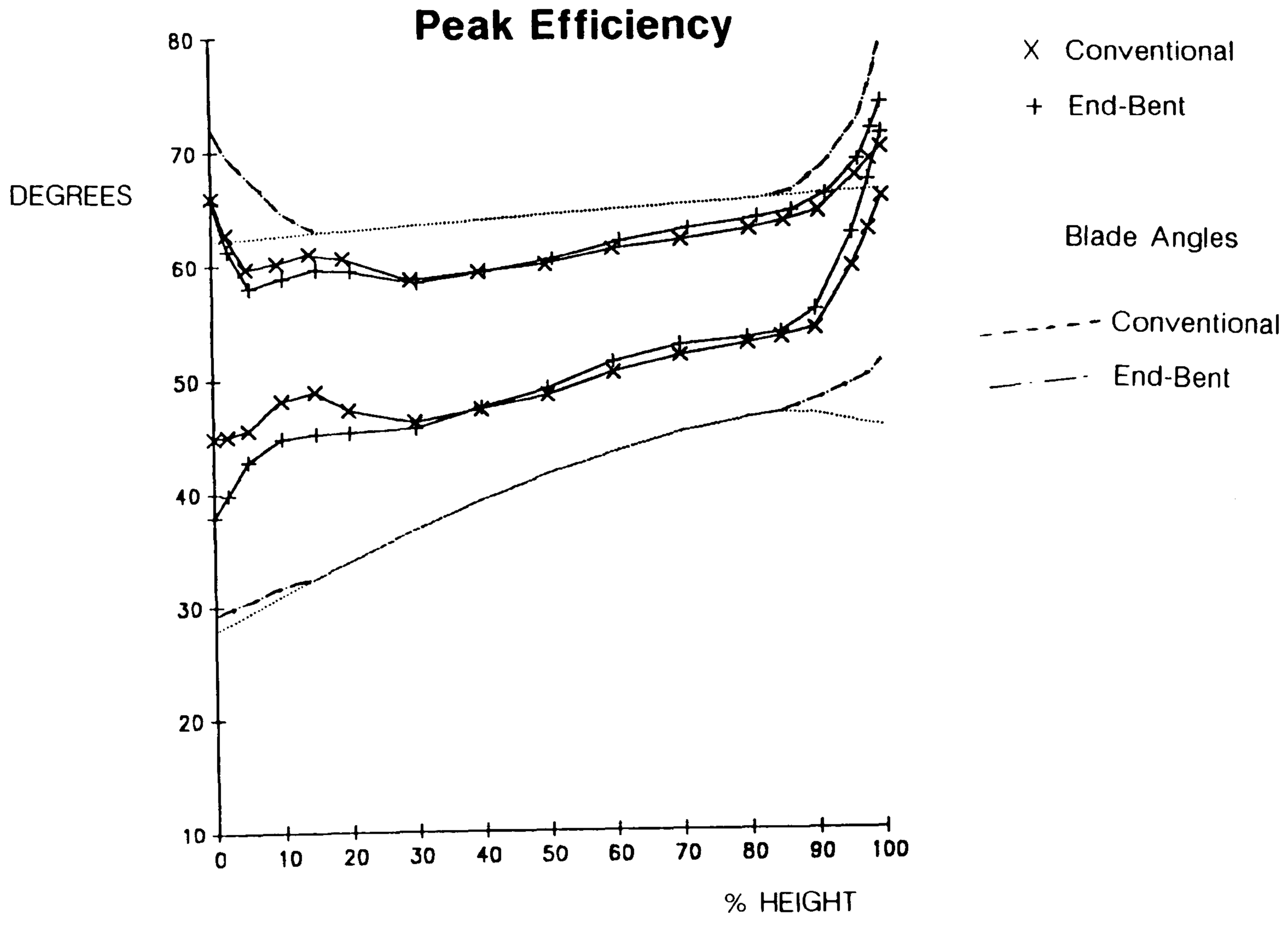


Fig 7.10

DCA DATUM AND IEB : ROTOR LOSS COEFFICIENTS

Peak Efficiency

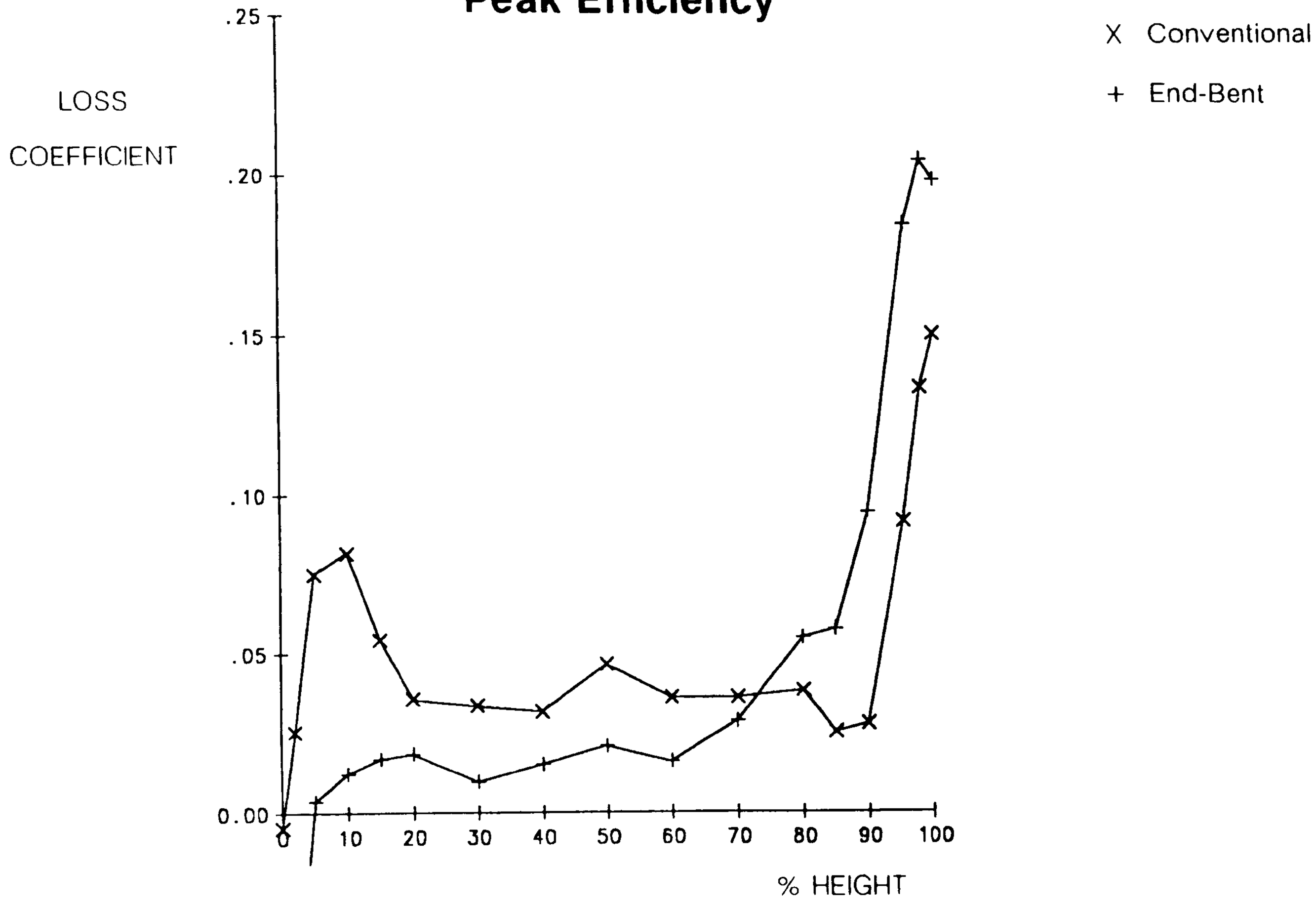


Fig 7.11

DCA DATUM AND IEB : STATOR GAS ANGLES

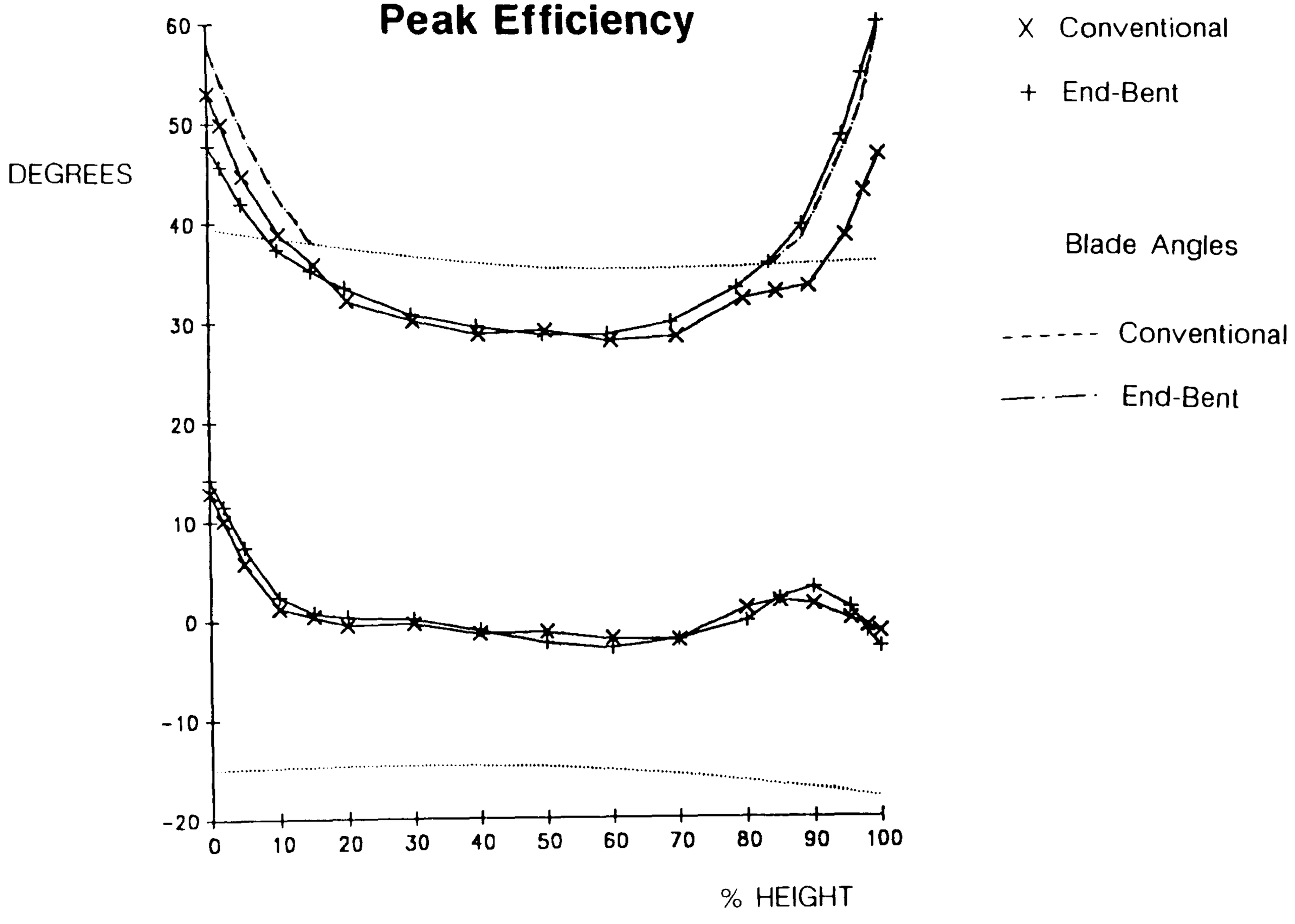


Fig 7.12

DCA DATUM AND IEB : STATOR LOSS COEFFICIENTS

Peak Efficiency

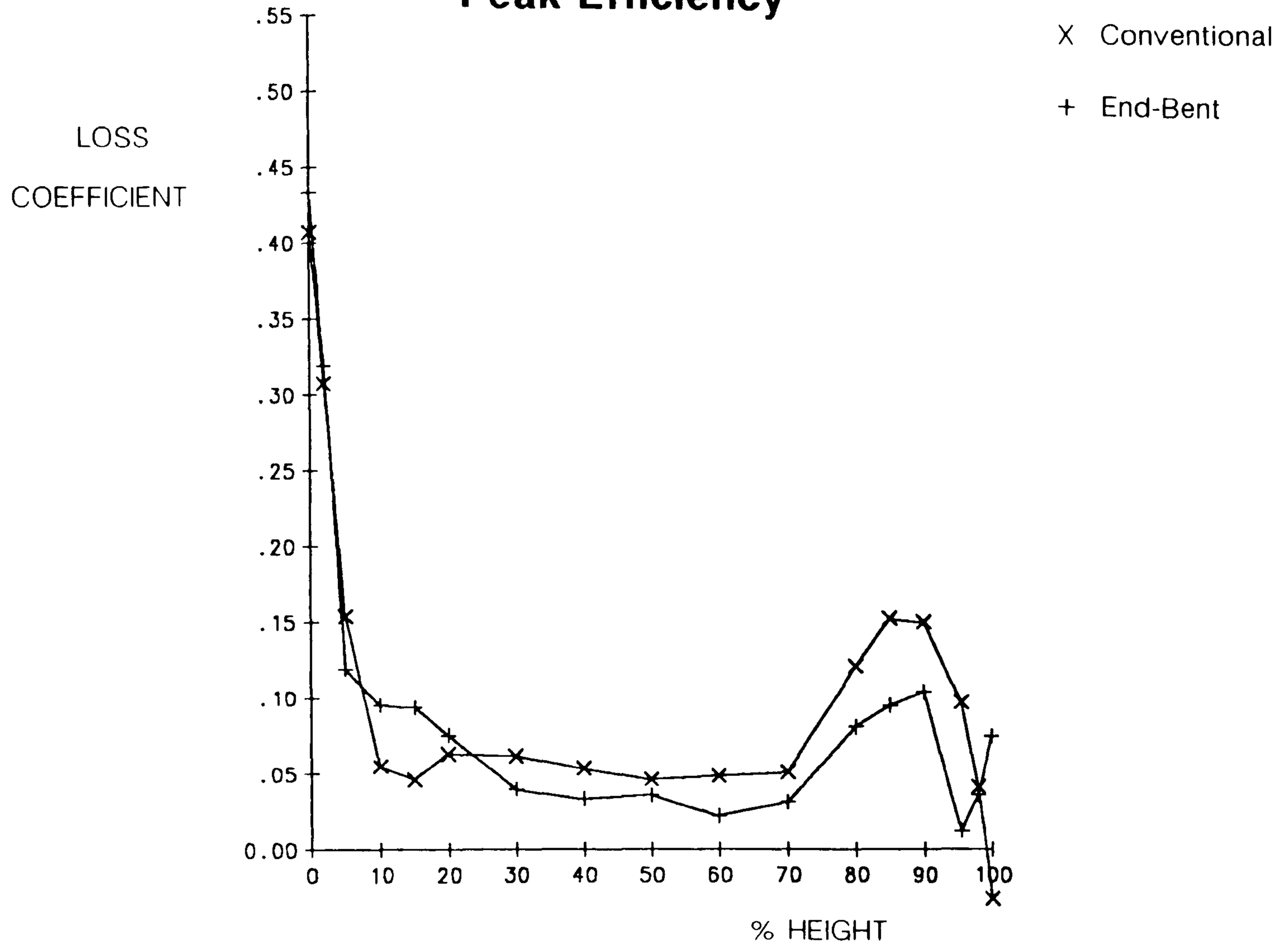


Fig 7.13

STAGE 3 EXIT CONDITIONS

PEAK EFFICIENCY

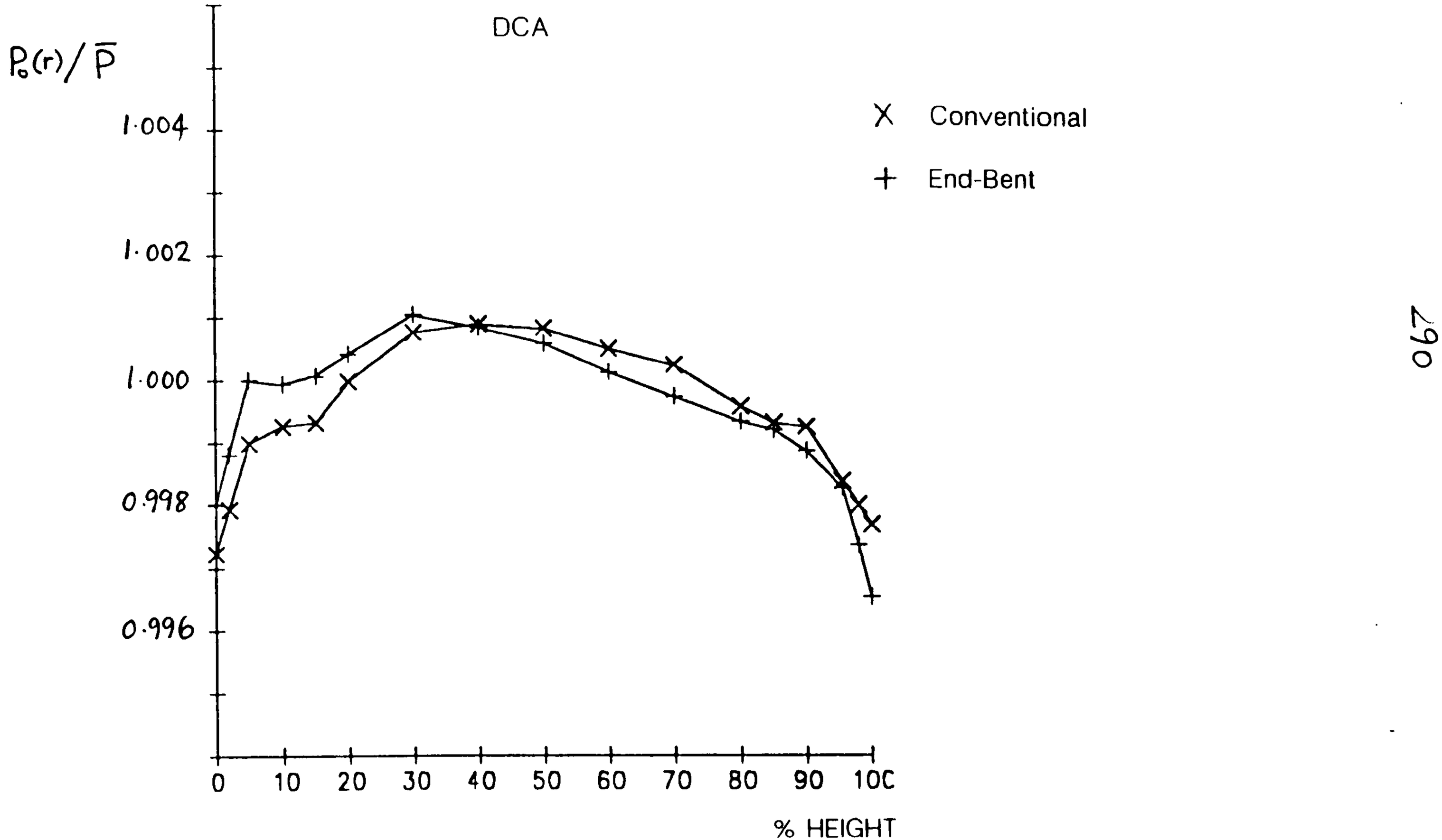


Fig 7.14

DCA DATUM AND IEB : STATOR GAS ANGLES

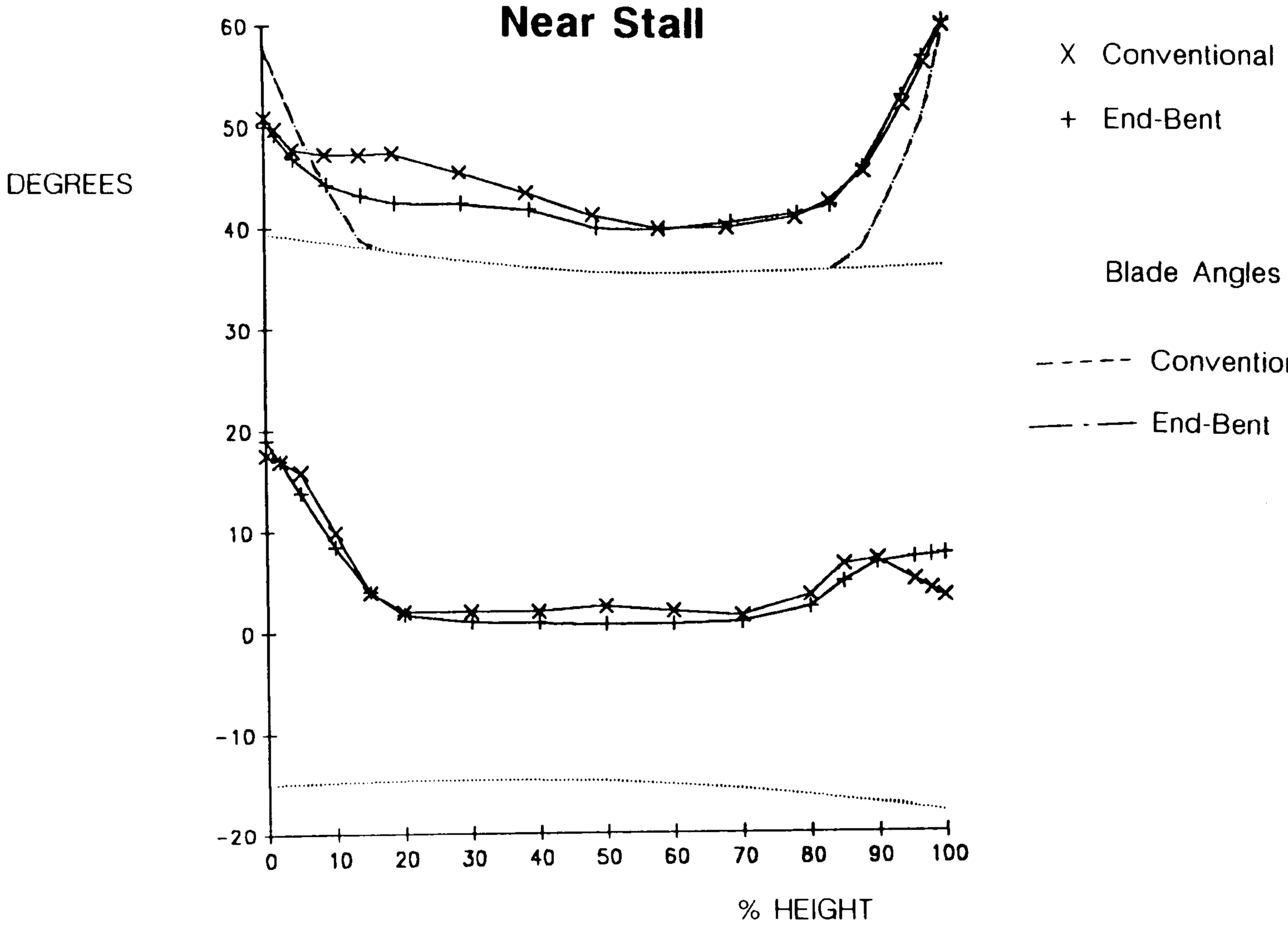


Fig 7.15

DCA DATUM AND IEB : STATOR LOSS COEFFICIENTS

Near Stall

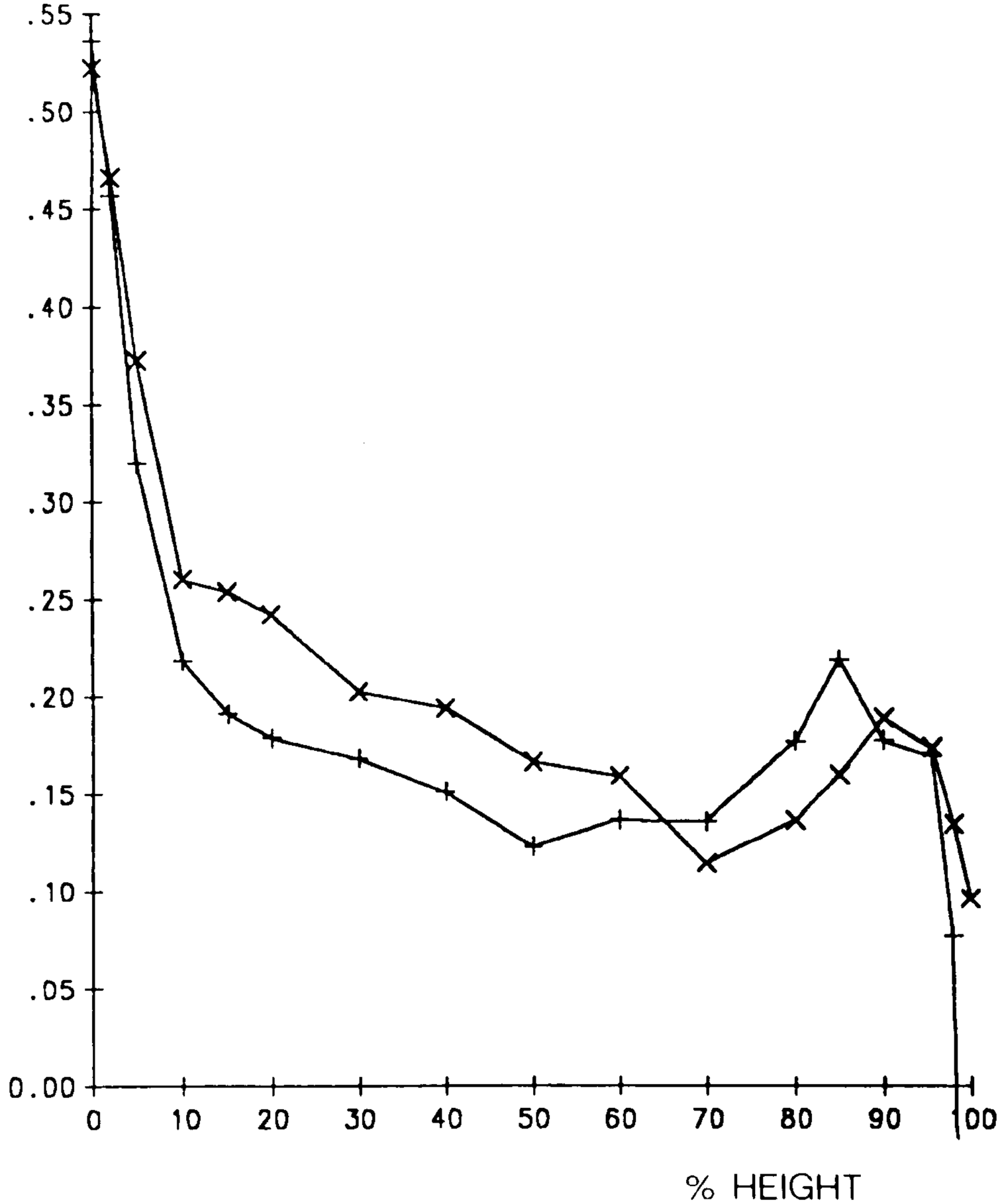
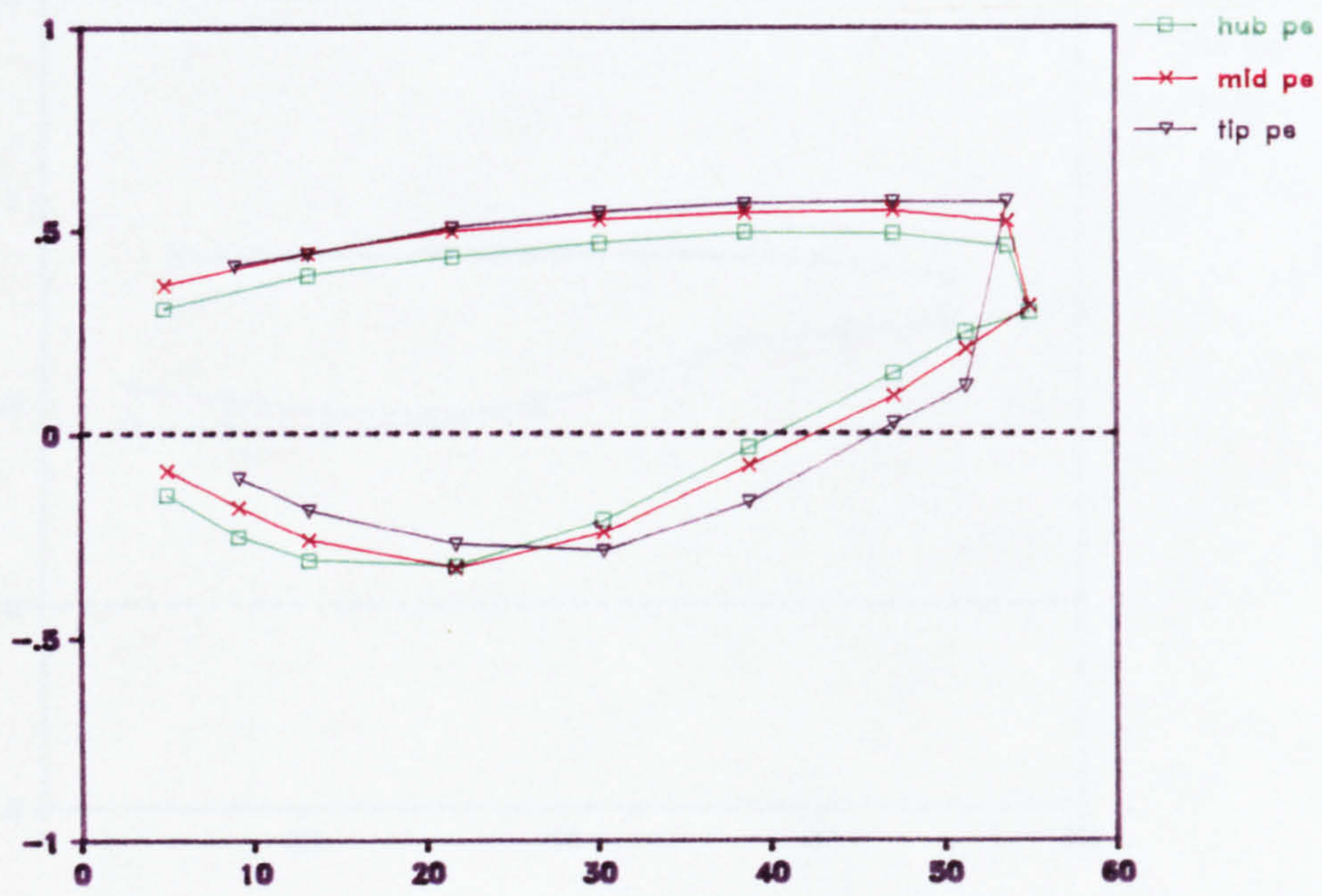


Fig 7.16

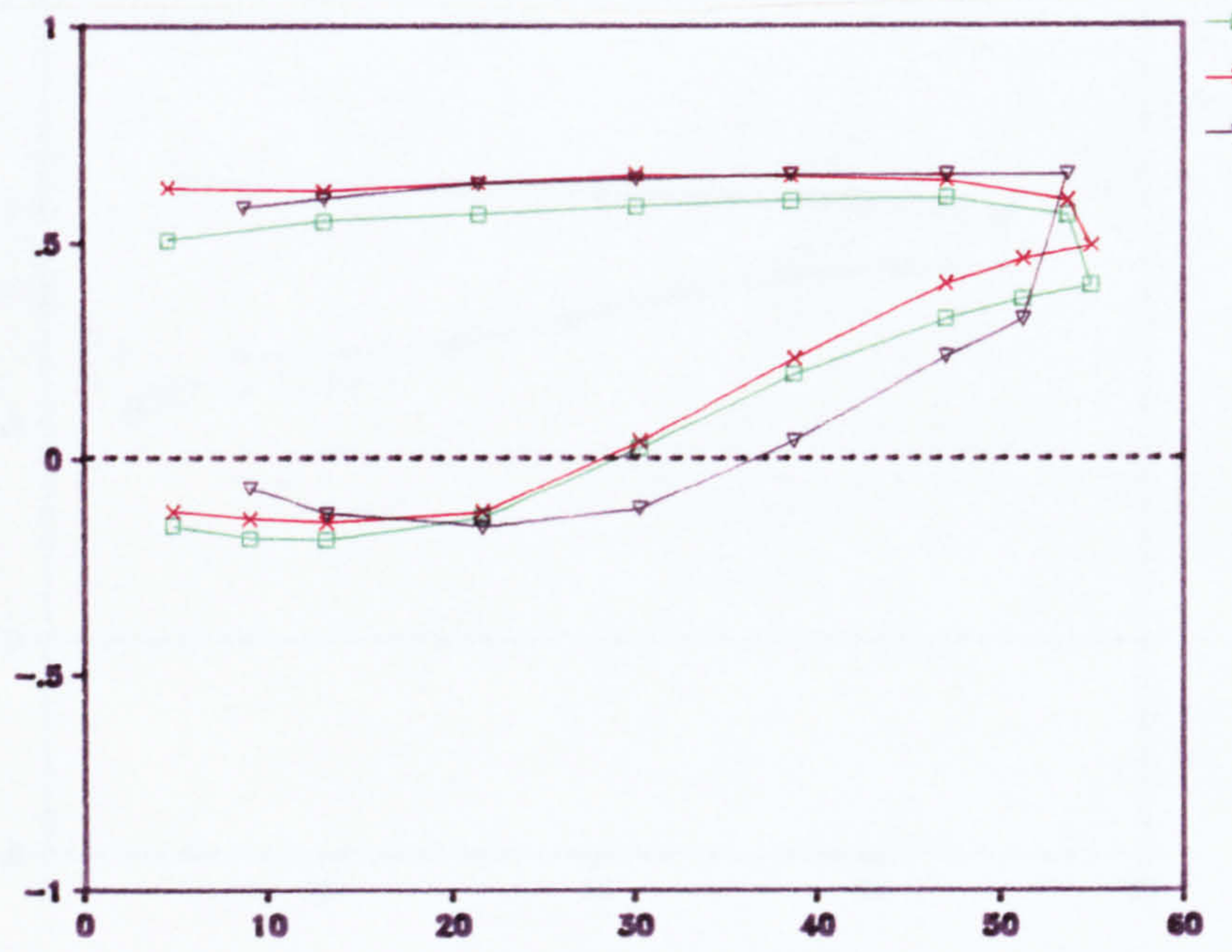
DCA IEB : ROTOR SURFACE STATIC PRESSURES

Peak Efficiency

ROTOR 2



Near Stall



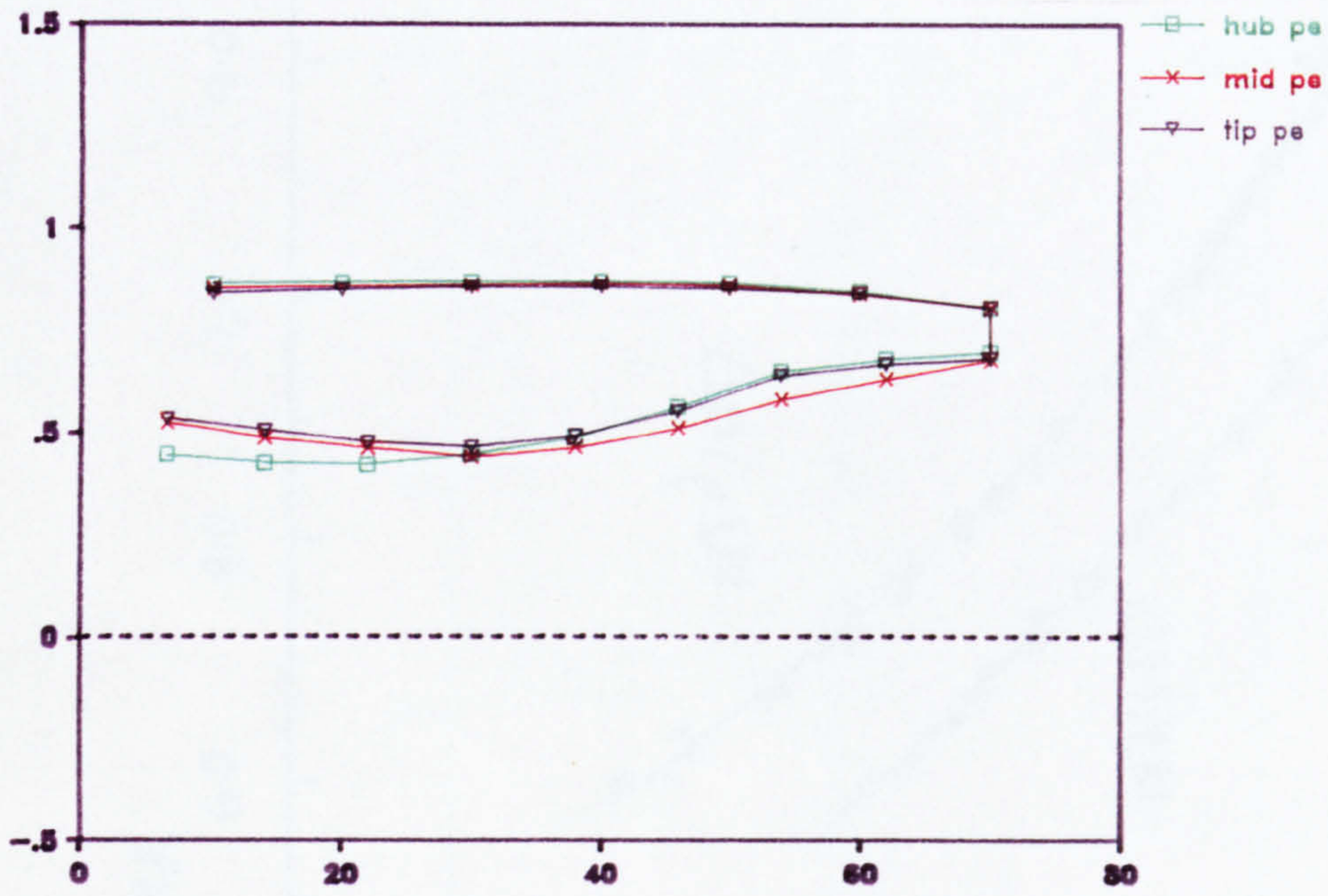
SURFACE DISTANCE (mm)

Fig 7.17

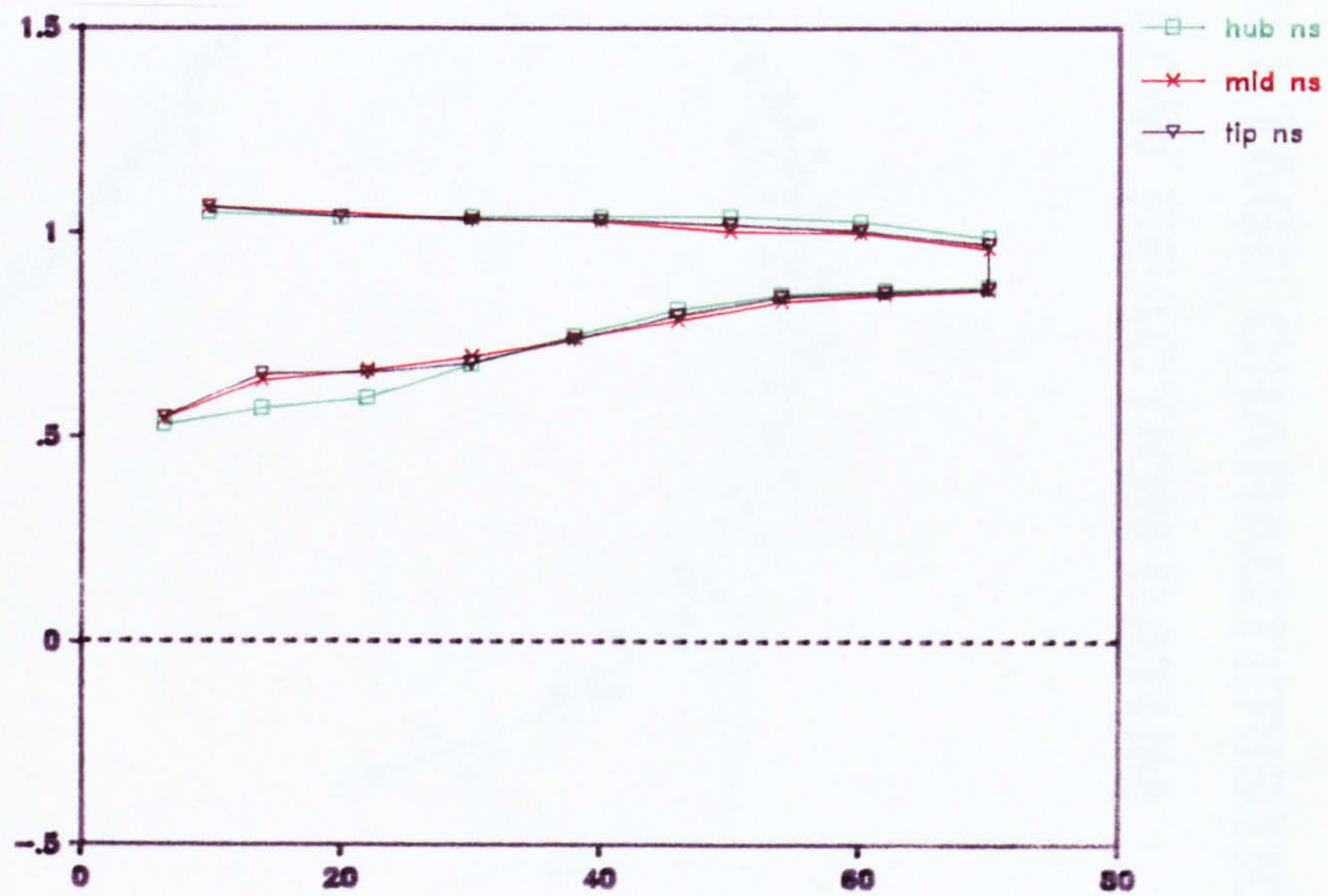
DCA IEB : STATOR SURFACE STATIC PRESSURES

Peak Efficiency

STATOR 2



Near Stall



SURFACE DISTANCE (mm)

Fig 7.18

MEAN STAGE CHARACTERISTICS

LOW REACTION DATUM

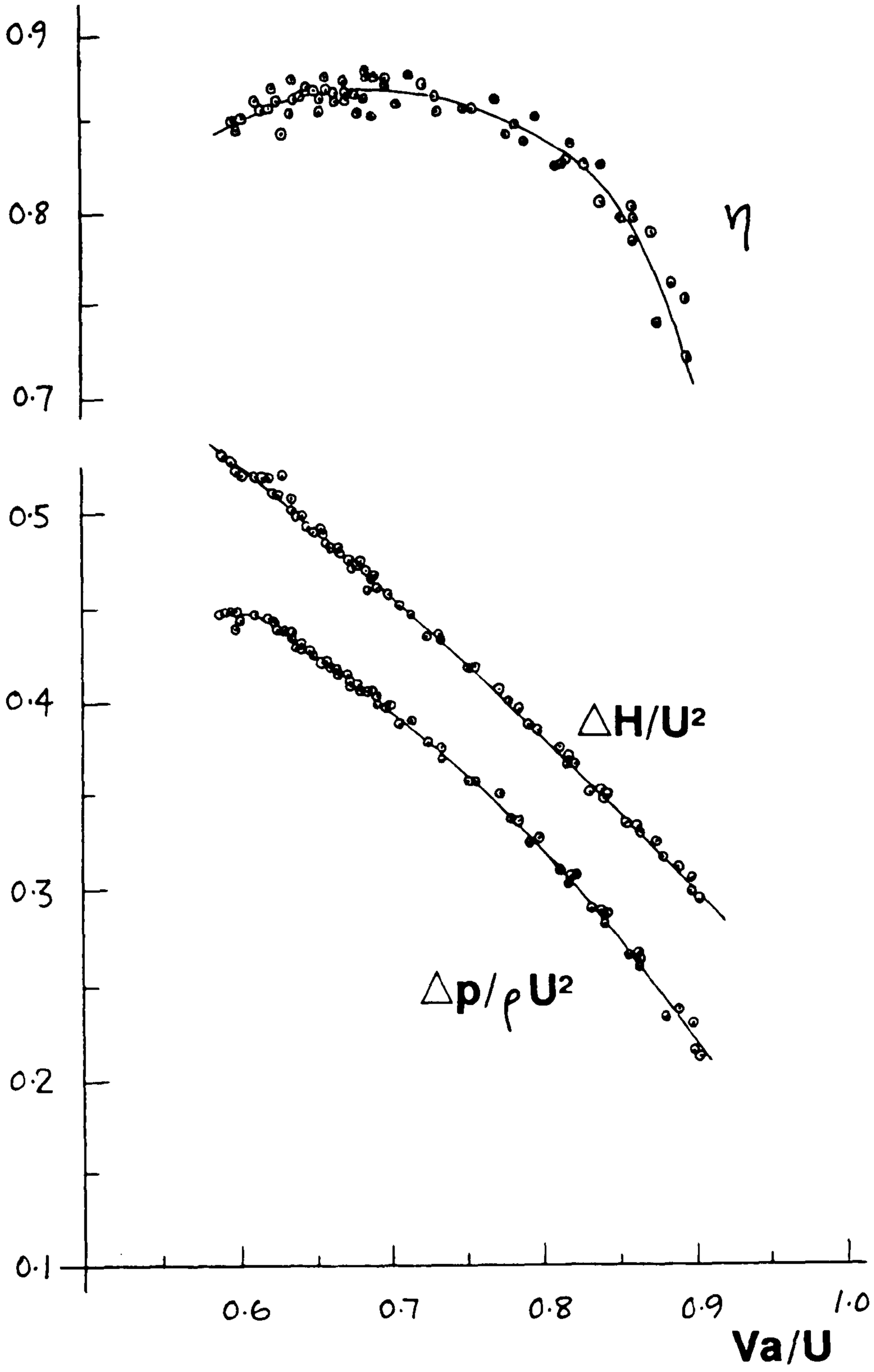


Fig 7.19

LOW REACTION IGV EXIT RADIAL TRAVERSE

Mid-Pitch

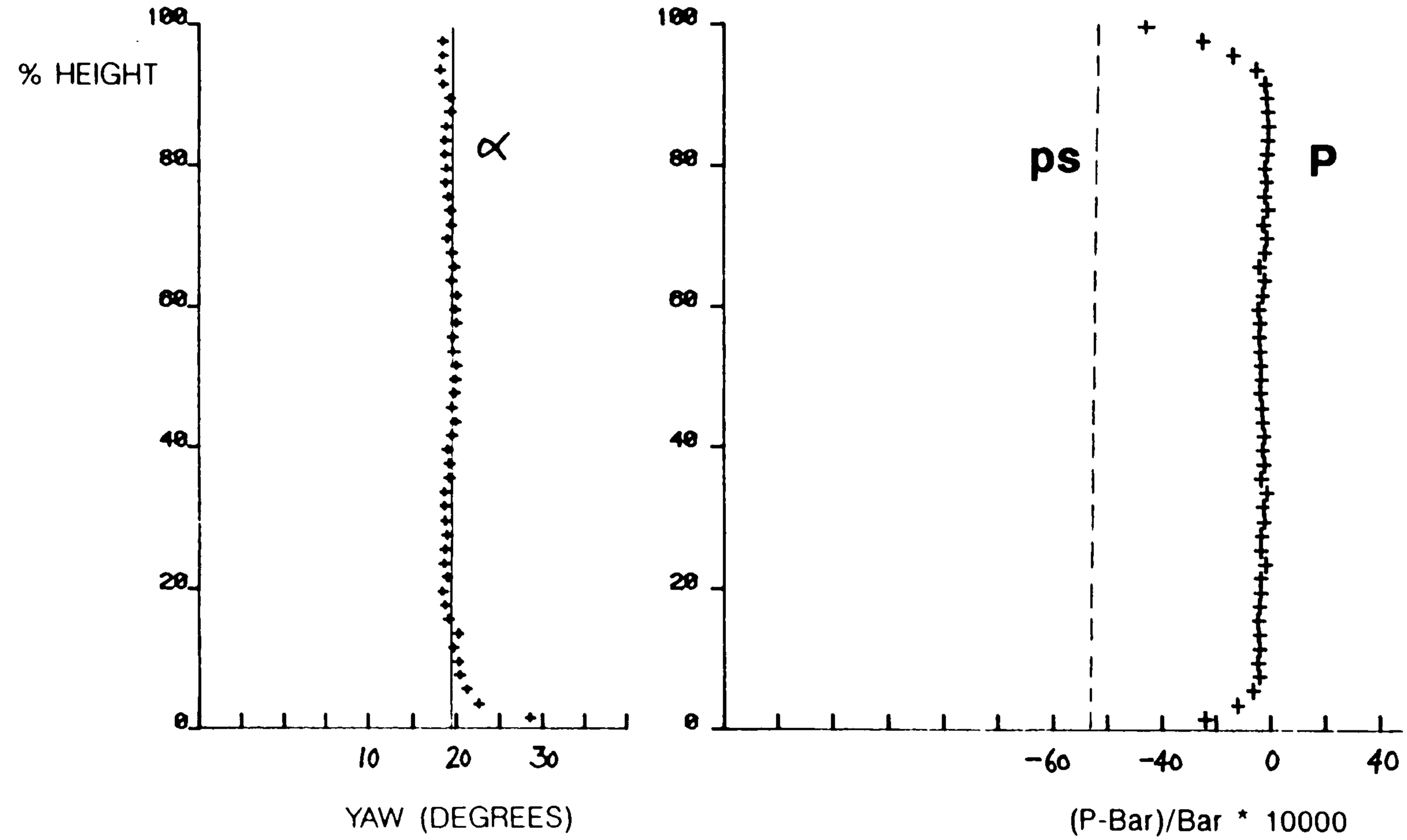
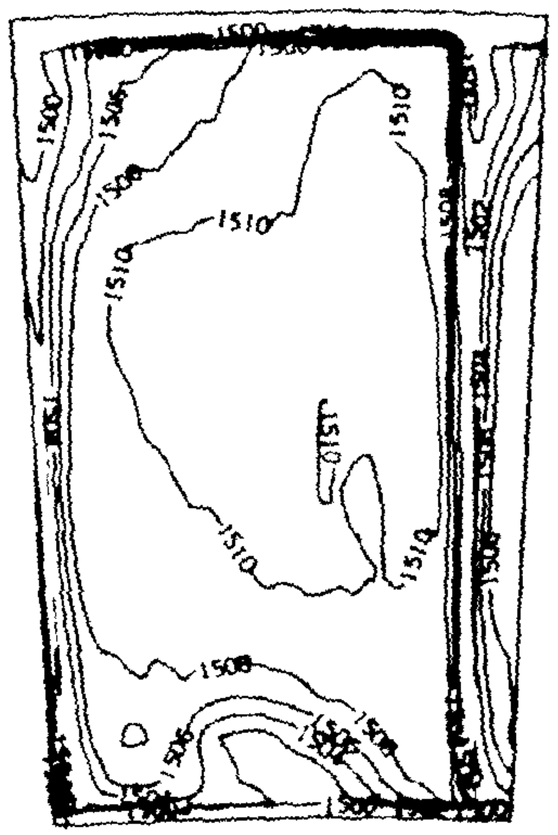


Fig 7.20

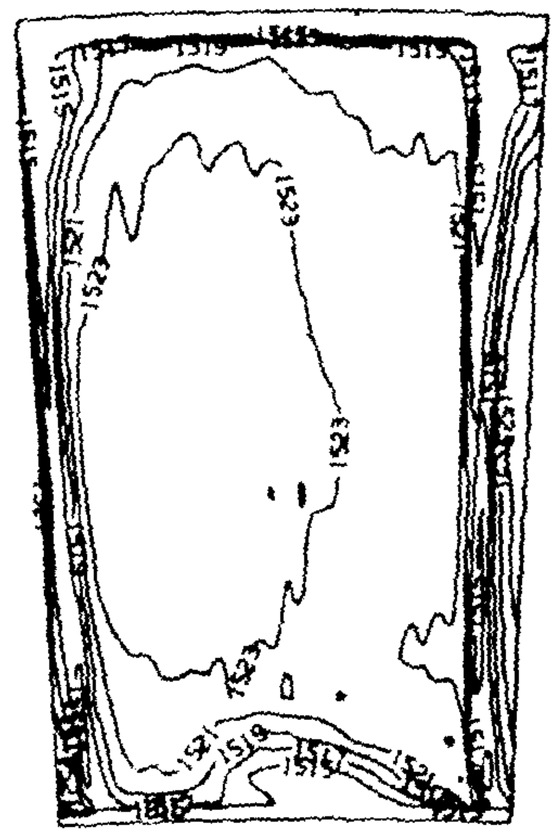
LOW REACTION DATUM : CONTOURS OF TOTAL PRESSURE

STATOR 2



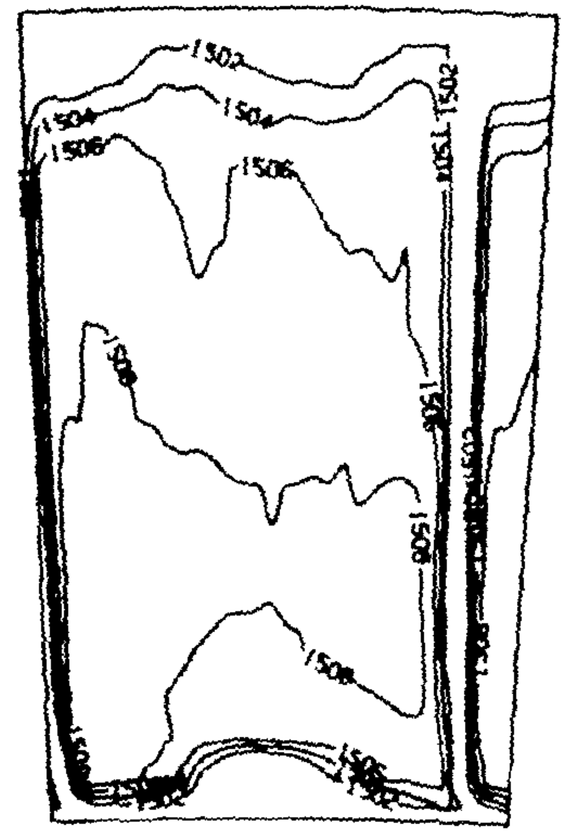
Near Stall

STATOR 3



Peak Efficiency

STATOR 3



High Flow

Fig 7.21

LOW REACTION DATUM : ROTOR GAS ANGLES

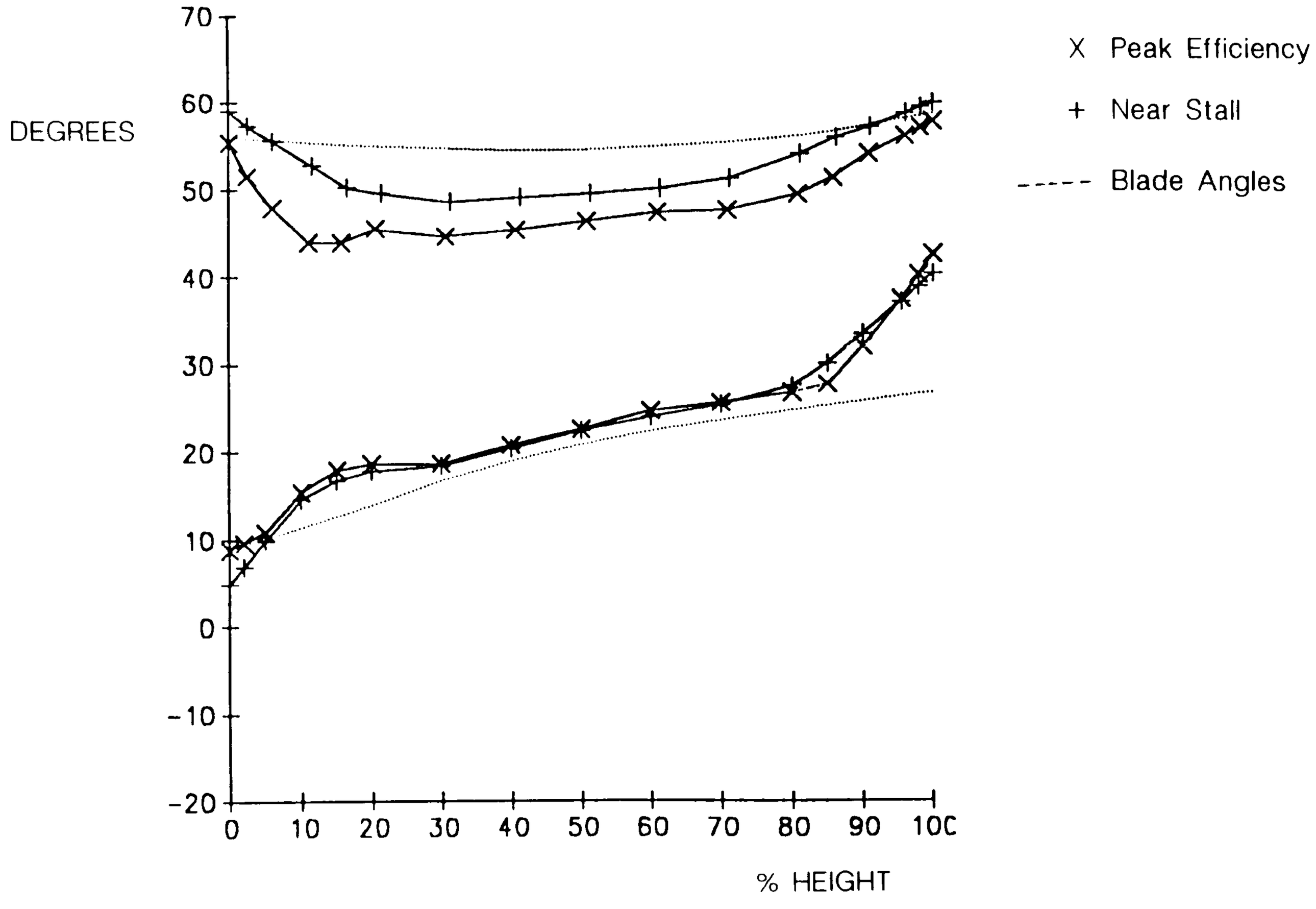


Fig 7.22

STAGE 3 EXIT CONDITIONS

LOW-REACTION DATUM

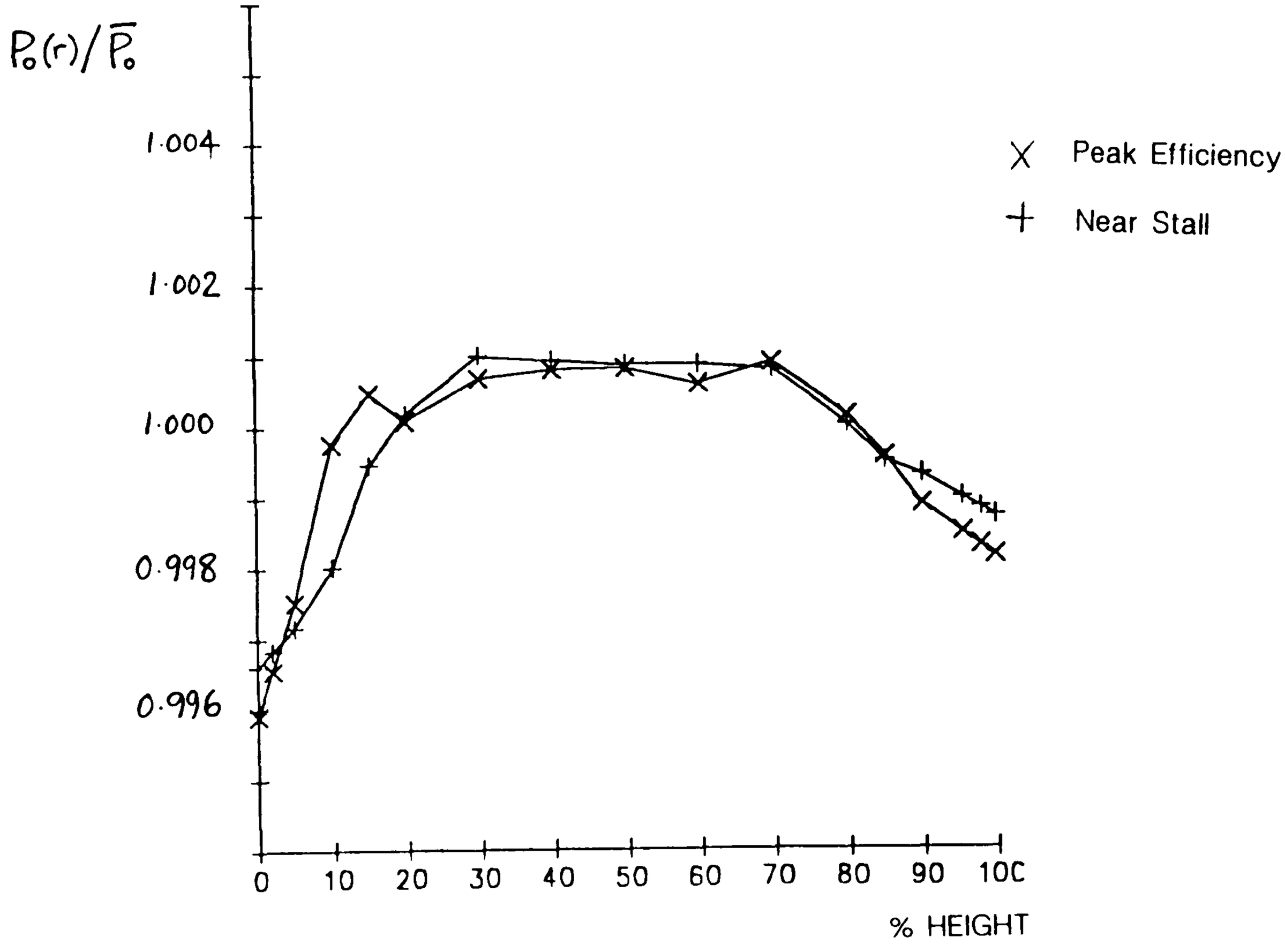


Fig 7.23

LOW REACTION DATUM : ROTOR LOSSES

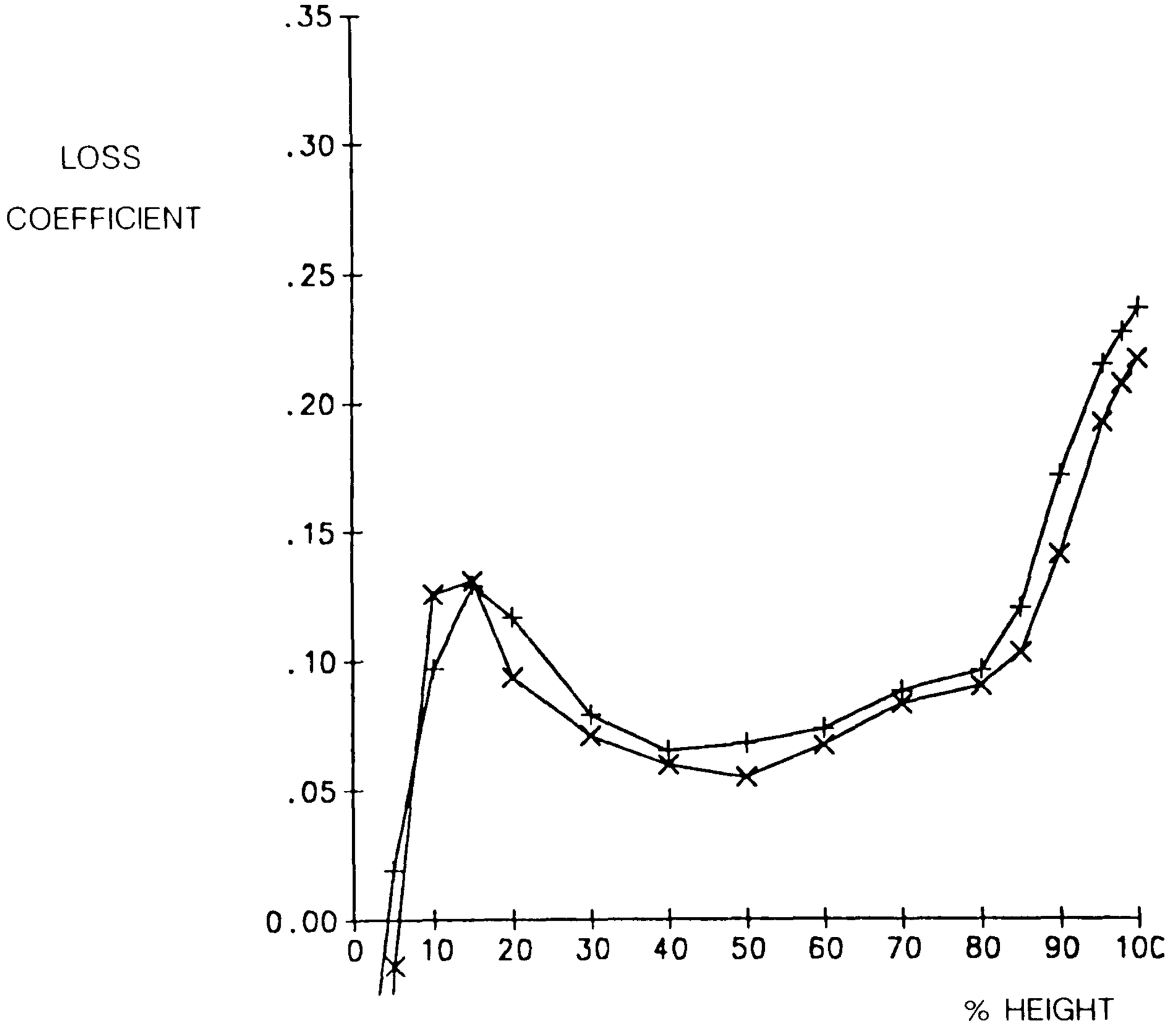


Fig 7.24

LOW REACTION DATUM : STATOR GAS ANGLES

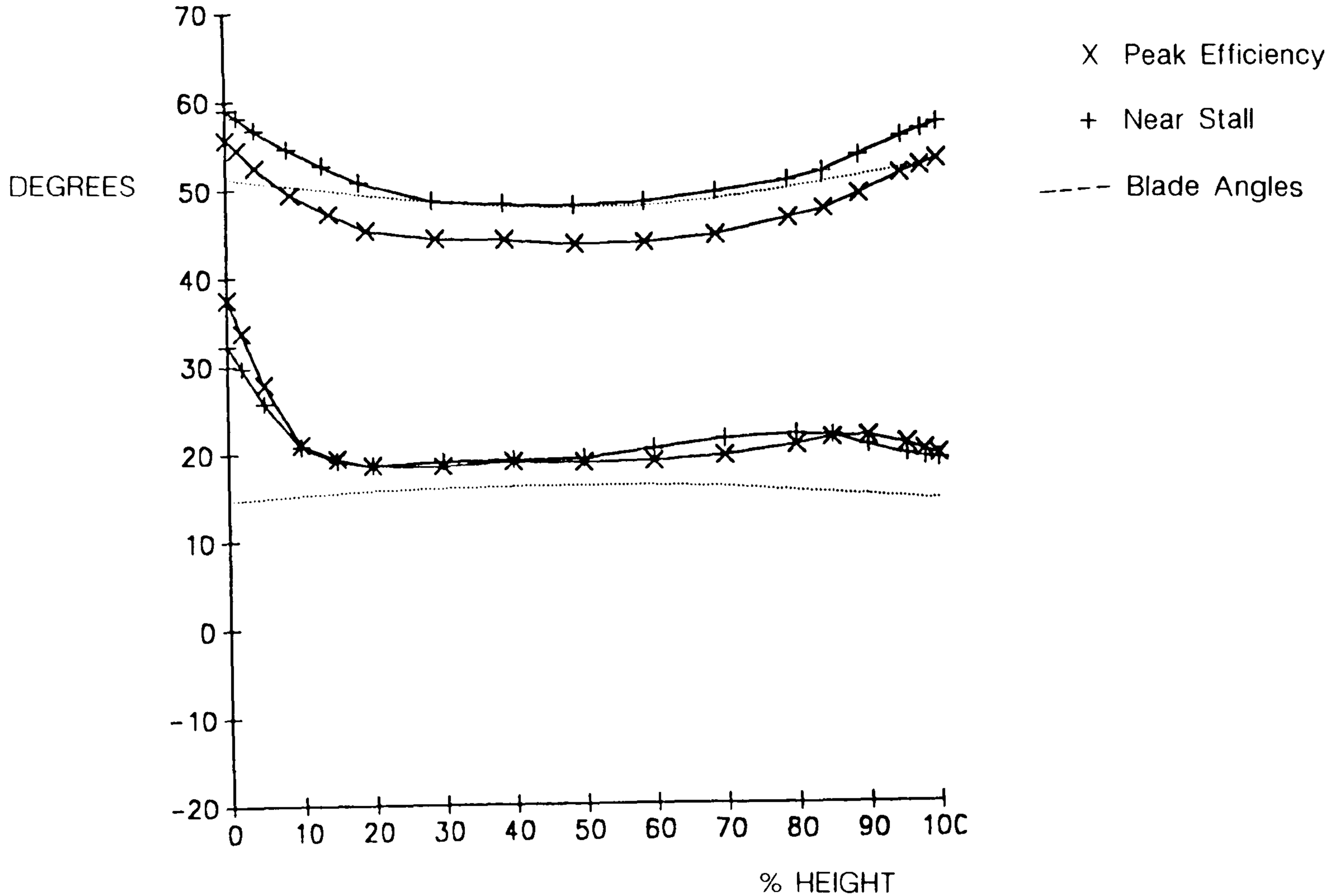


Fig 7.25

LOW REACTION DATUM : STATOR LOSSES

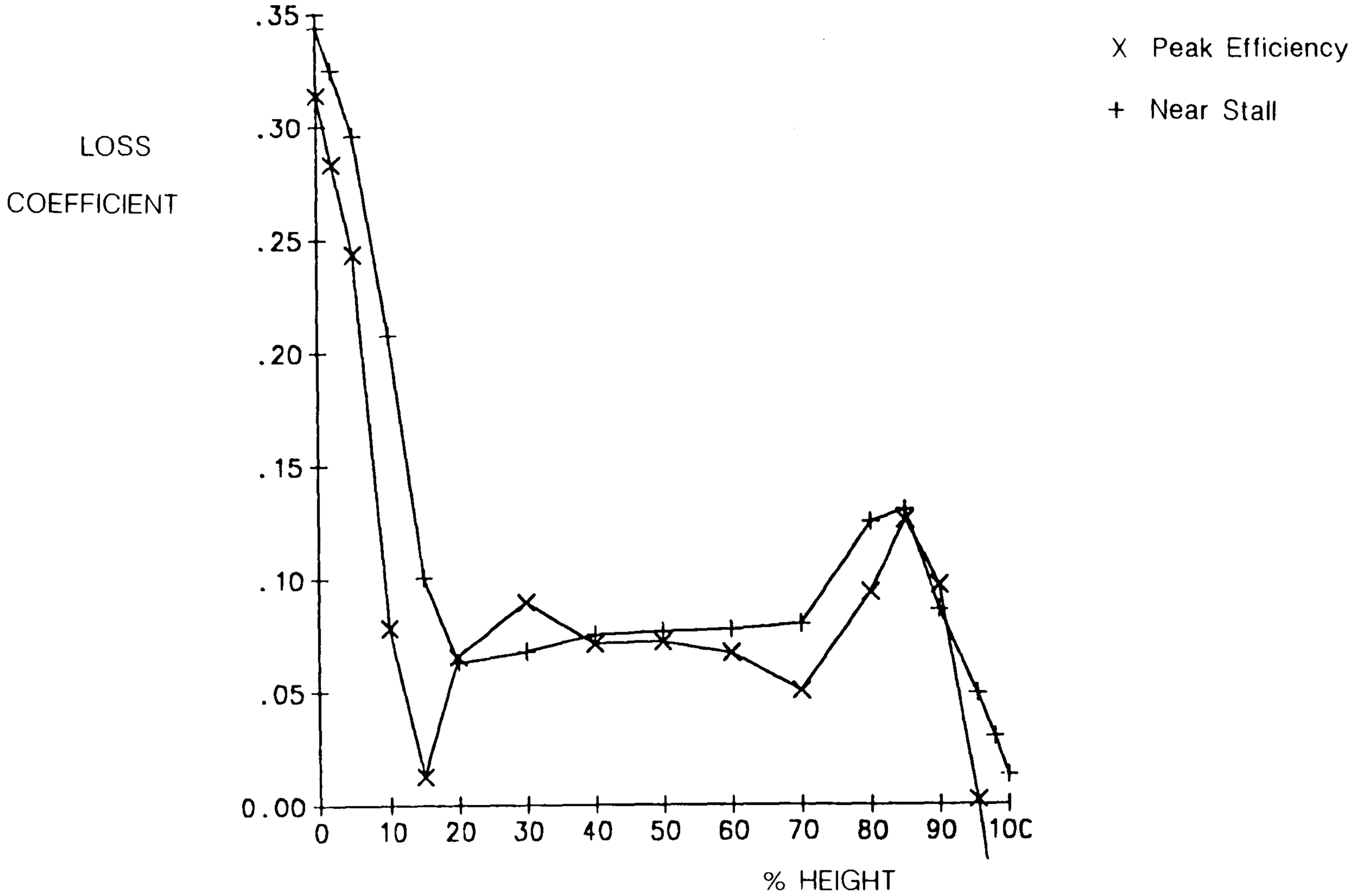


Fig 7.26

LOW REACTION DATUM : ROTOR SURFACE STATICS

Peak Efficiency

ROTOR 2

Near Stall

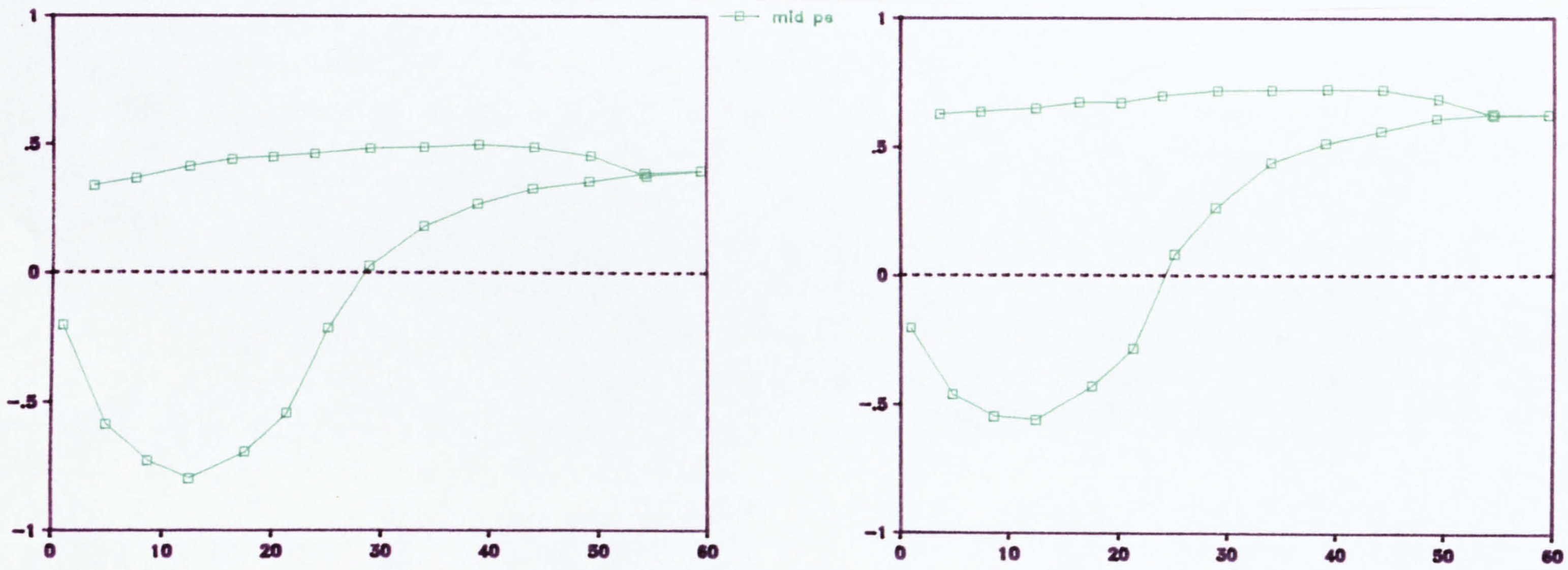


Fig 7.27

LOW REACTION DATUM : STATOR SURFACE STATICS

Peak Efficiency

STATOR 2

Near Stall

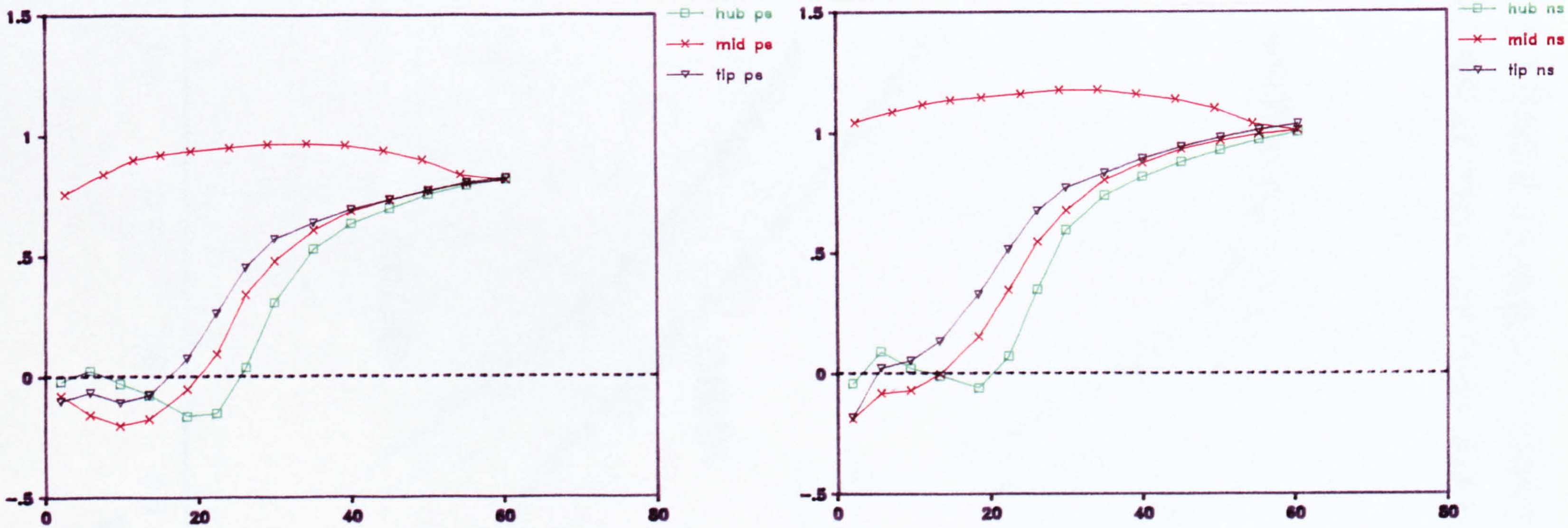


Fig 7.28

MEAN STAGE CHARACTERISTICS
LOW REACTION DATUM AND IEB

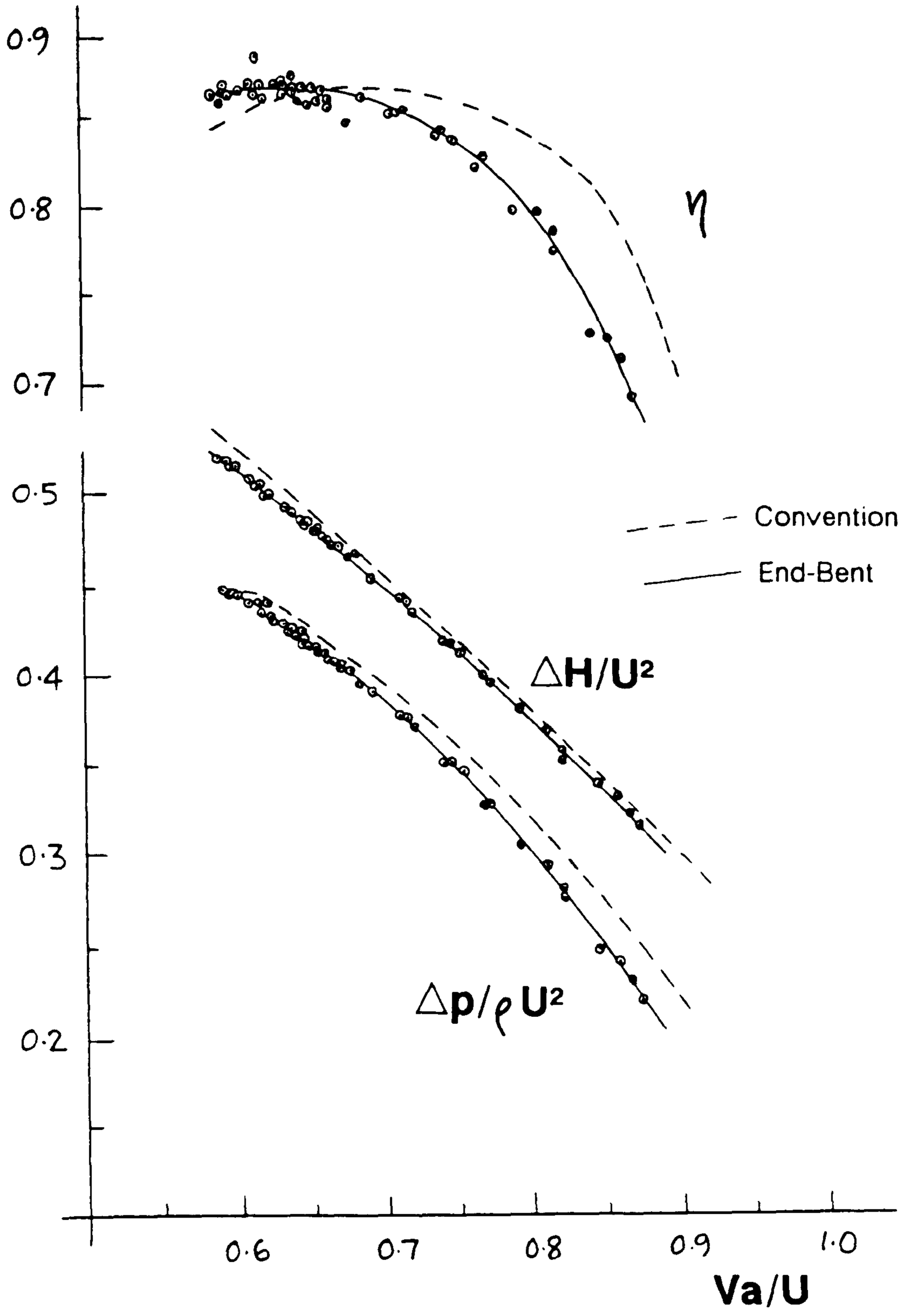


Fig 7.29

LOW REACTION DATUM AND IEB : AXIAL REACTION DISTRIBUTION

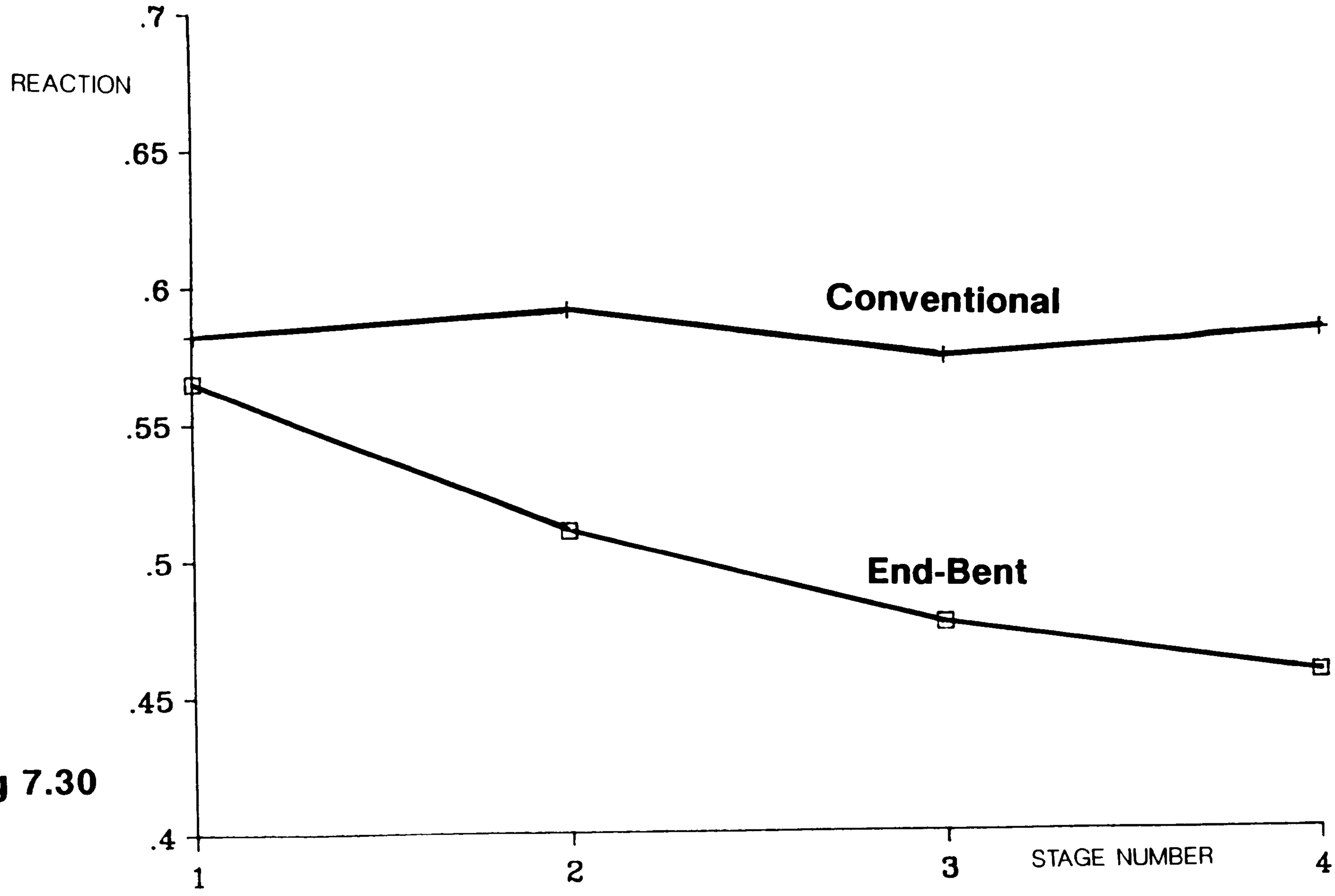
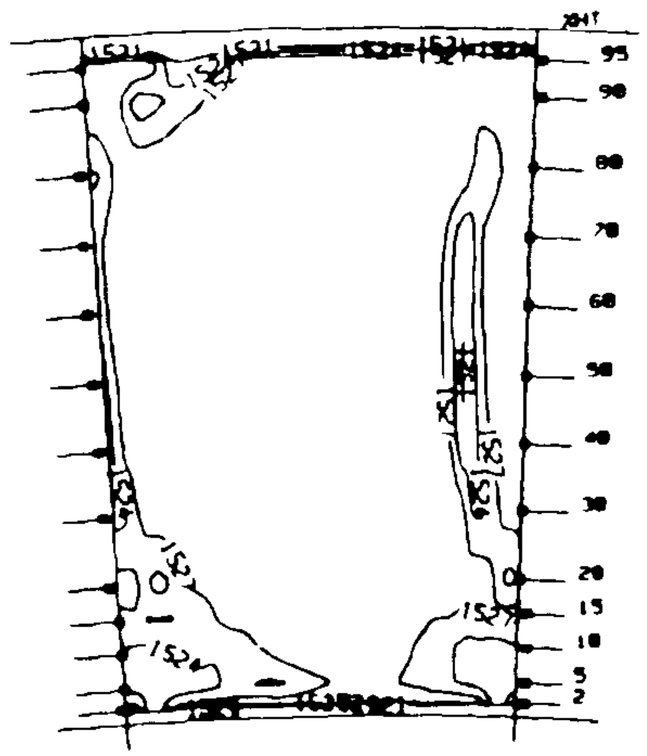


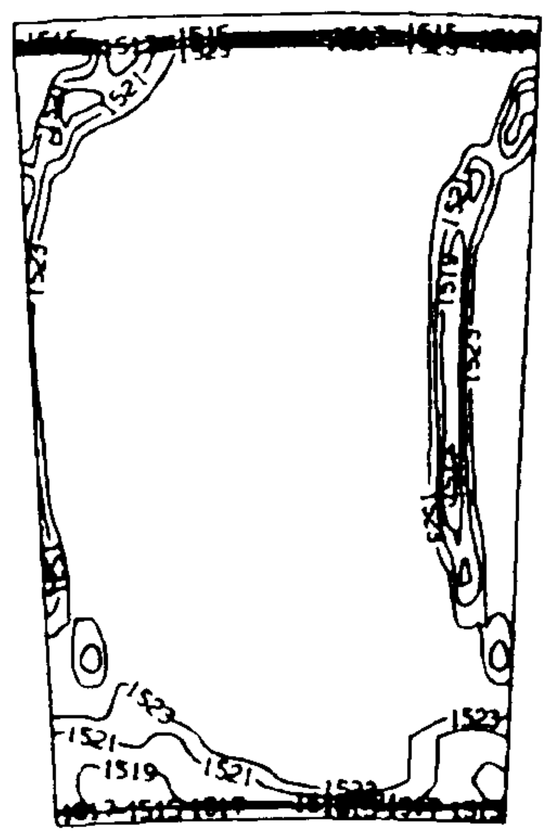
Fig 7.30

LOW REACTION IEB : CONTOURS OF TOTAL PRESSURE

Stator 3 Exit



Near Stall



Peak Efficiency

Fig 7.31

LOW REACTION DATUM AND IEB : ROTOR GAS ANGLES

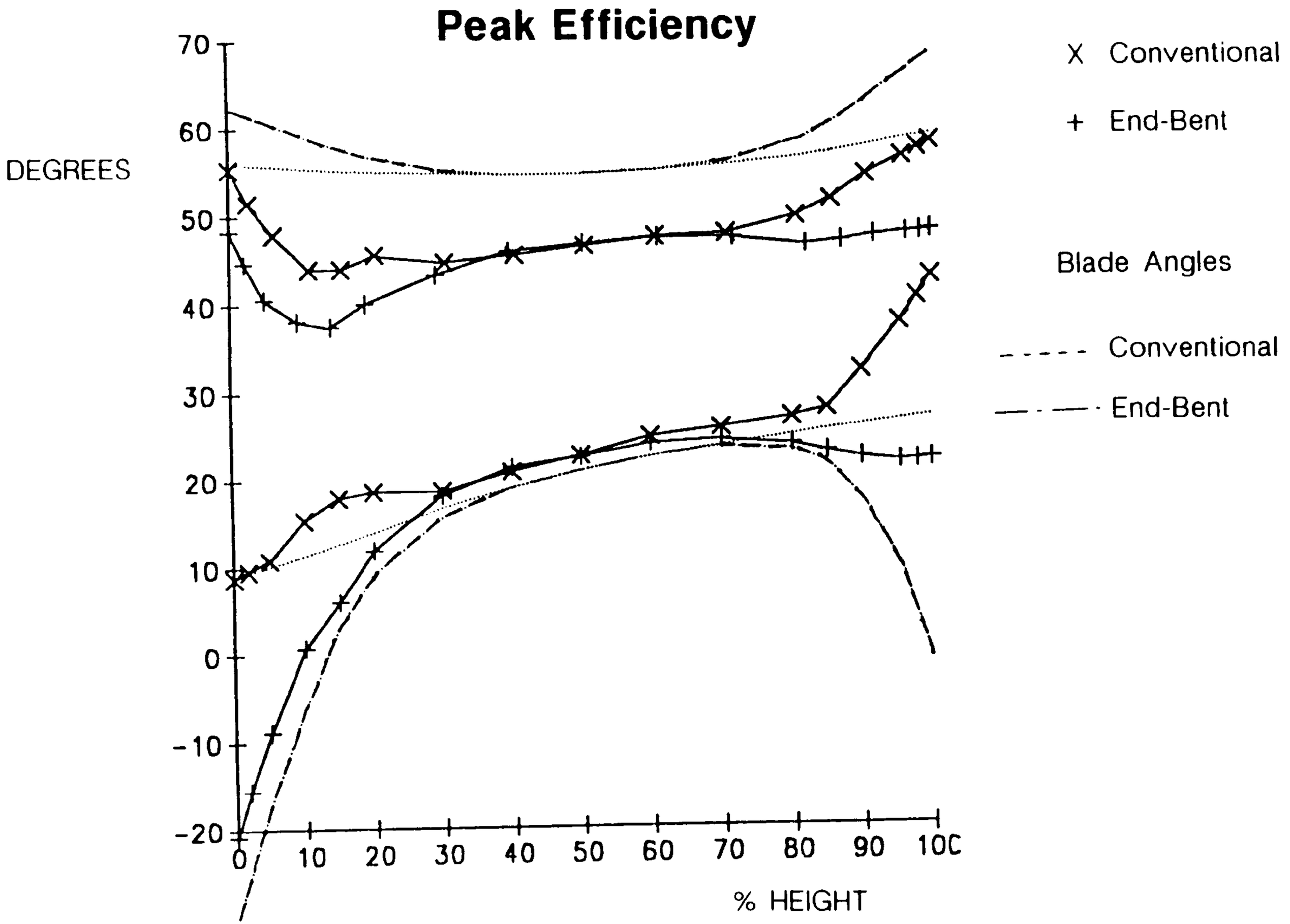


Fig 7.32

LOW REACTION DATUM AND IEB : ROTOR LOSSES

Peak Efficiency

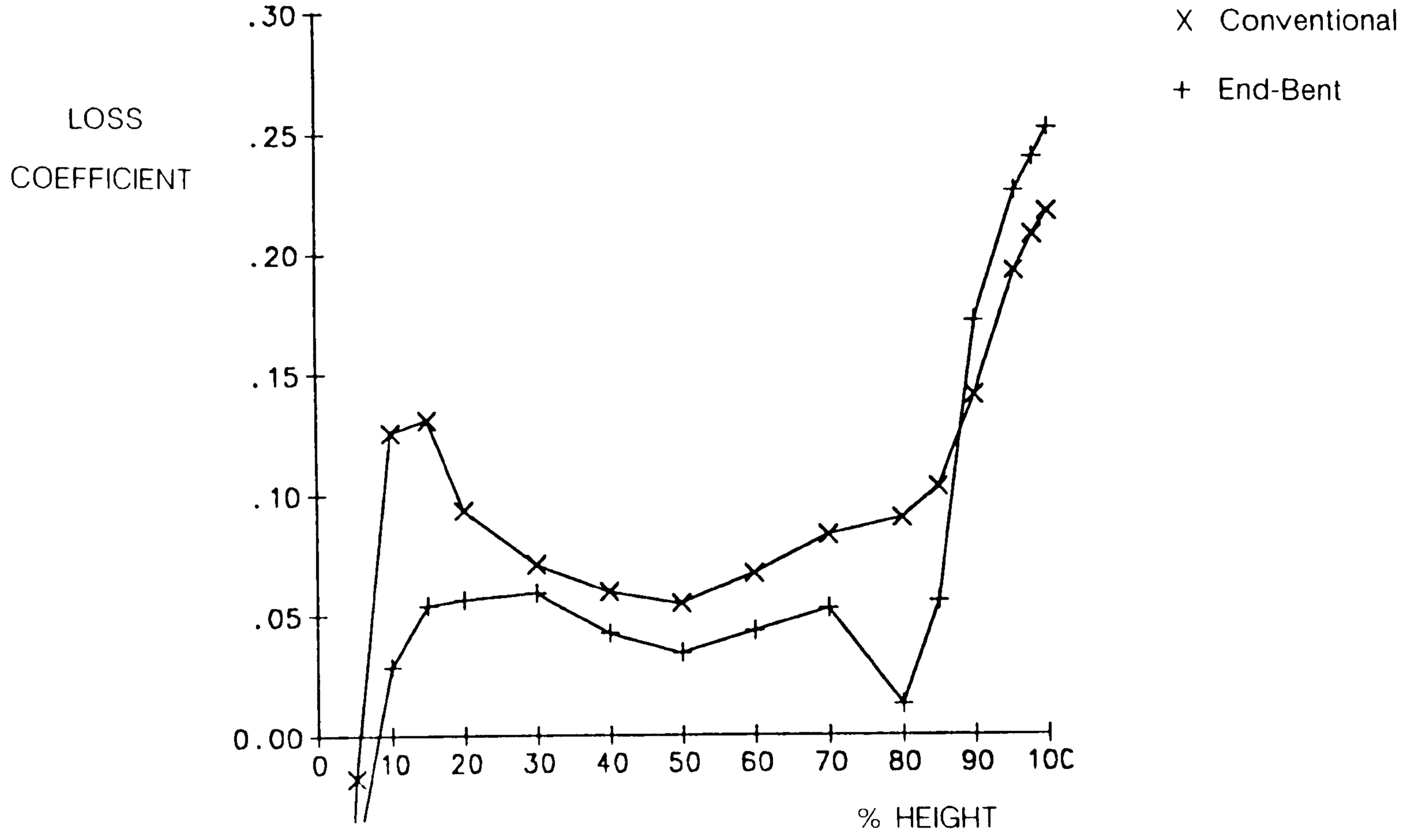


Fig 7.33

LOW REACTION DATUM AND IEB : STATOR GAS ANGLES

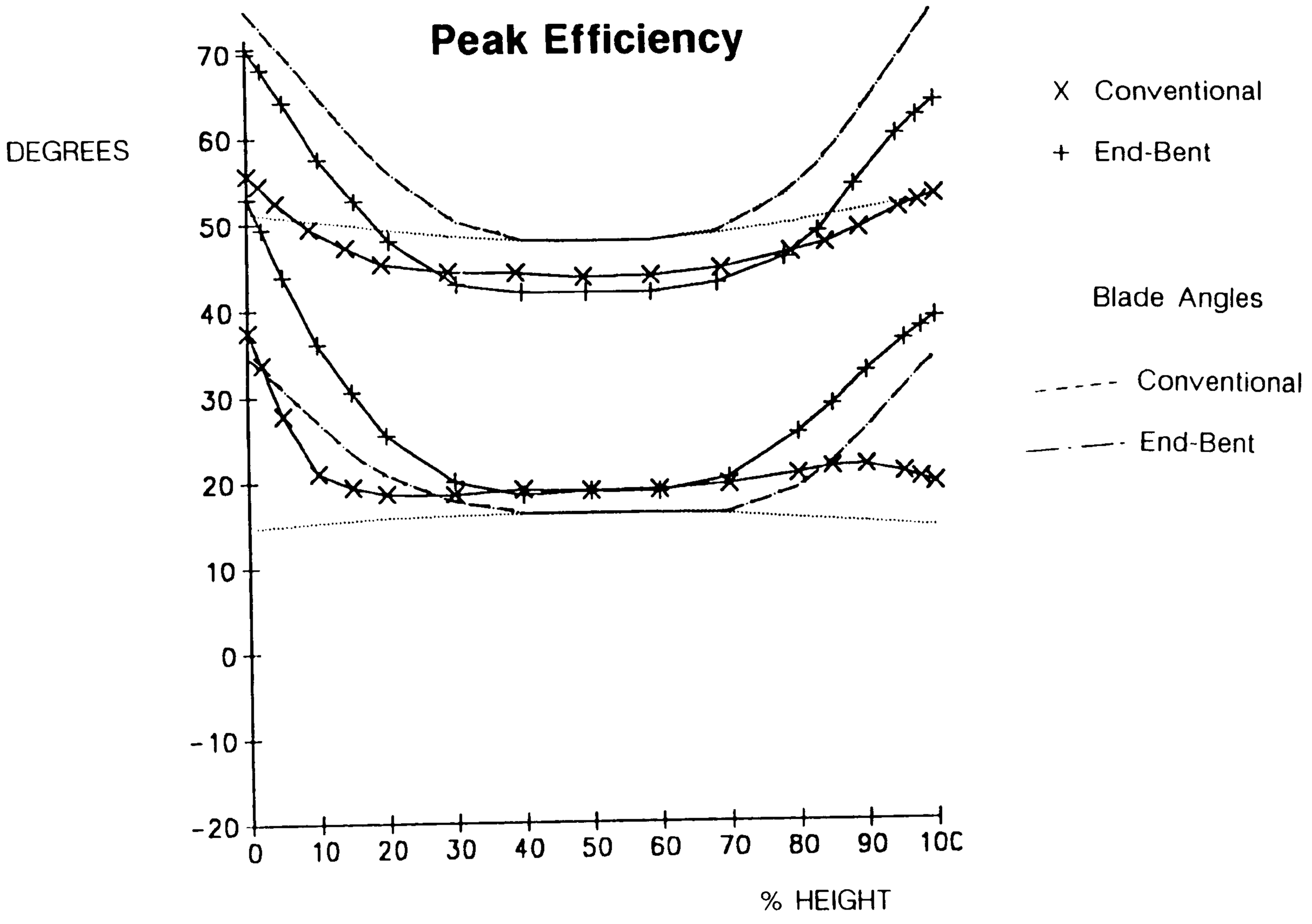


Fig 7.34

LOW REACTION DATUM AND IEB : STATOR LOSSES

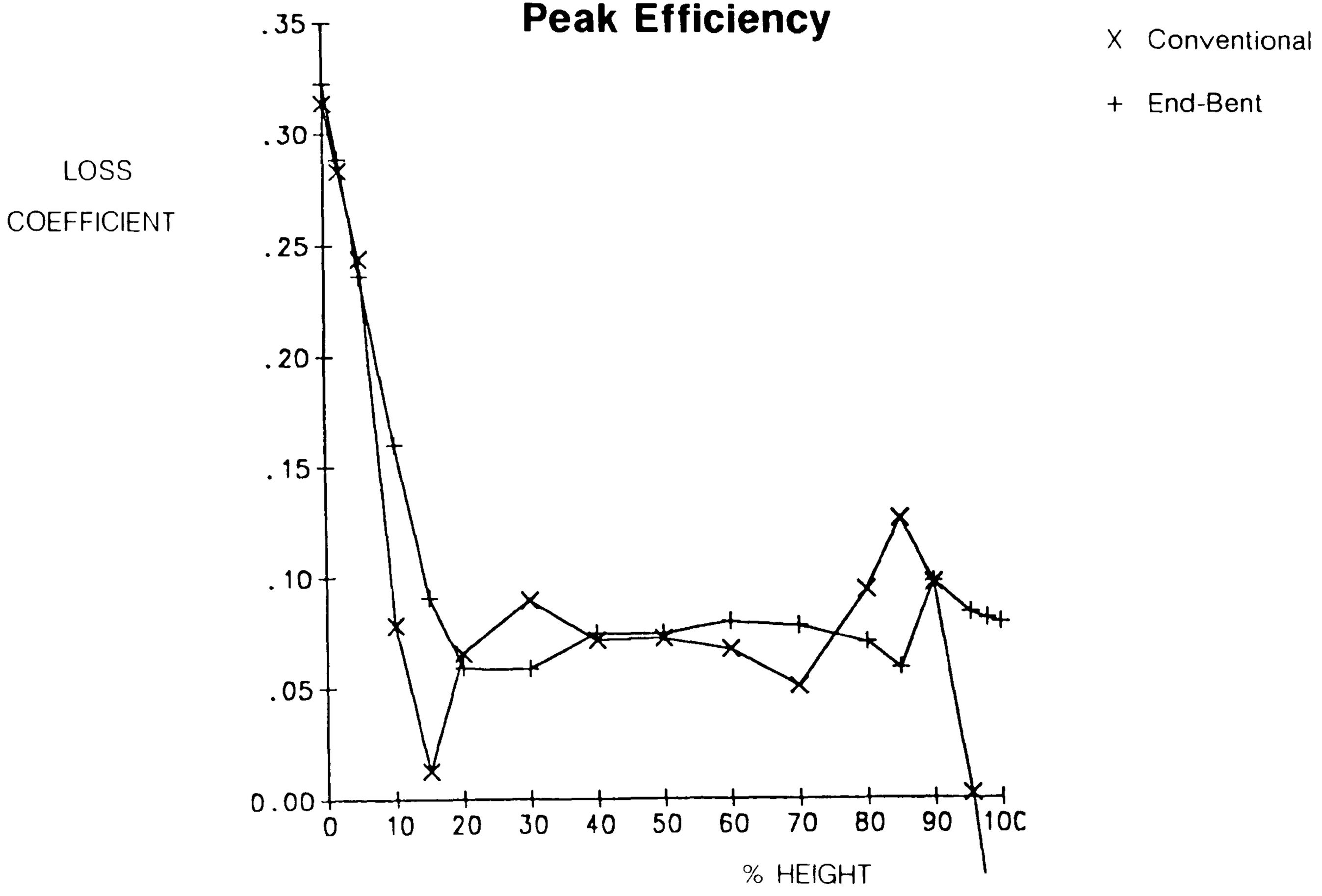


Fig 7.35

LOW REACTION DATUM AND IEB : ROTOR VELOCITY RATIOS

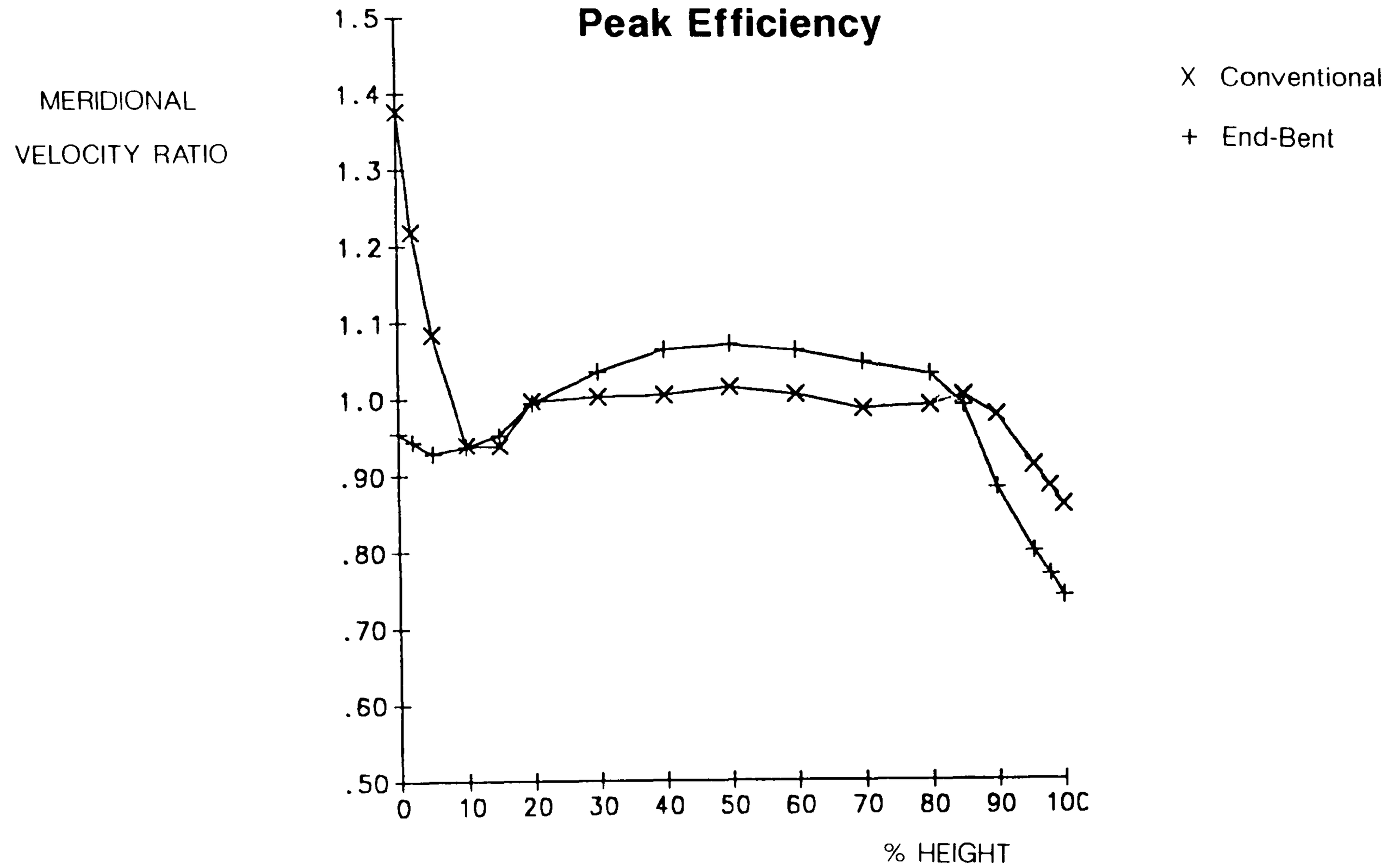


Fig 7.36a

LOW REACTION DATUM AND IEB : STATOR VELOCITY RATIOS

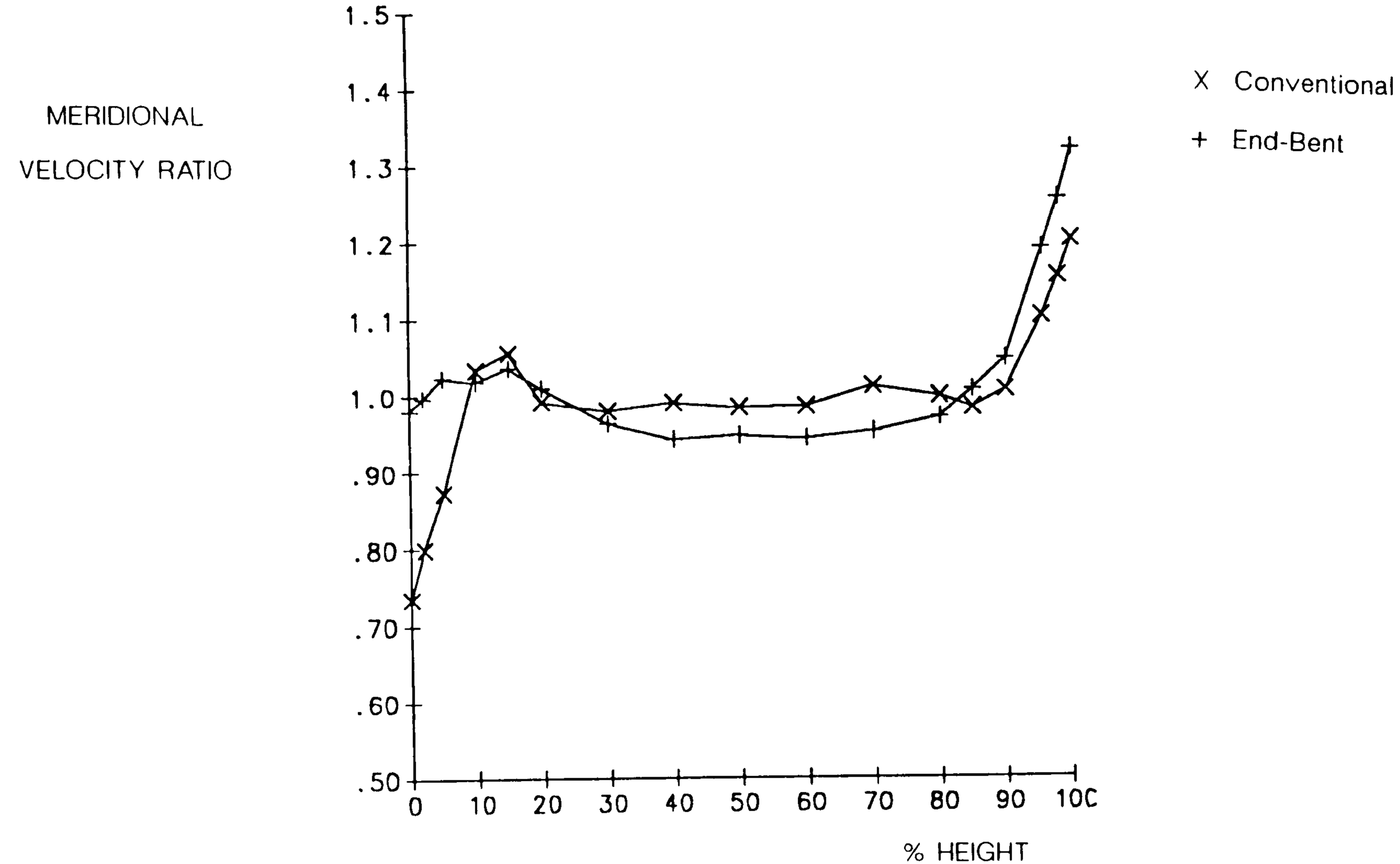


Fig 7.36b

STAGE 3 EXIT CONDITIONS

PEAK EFFICIENCY

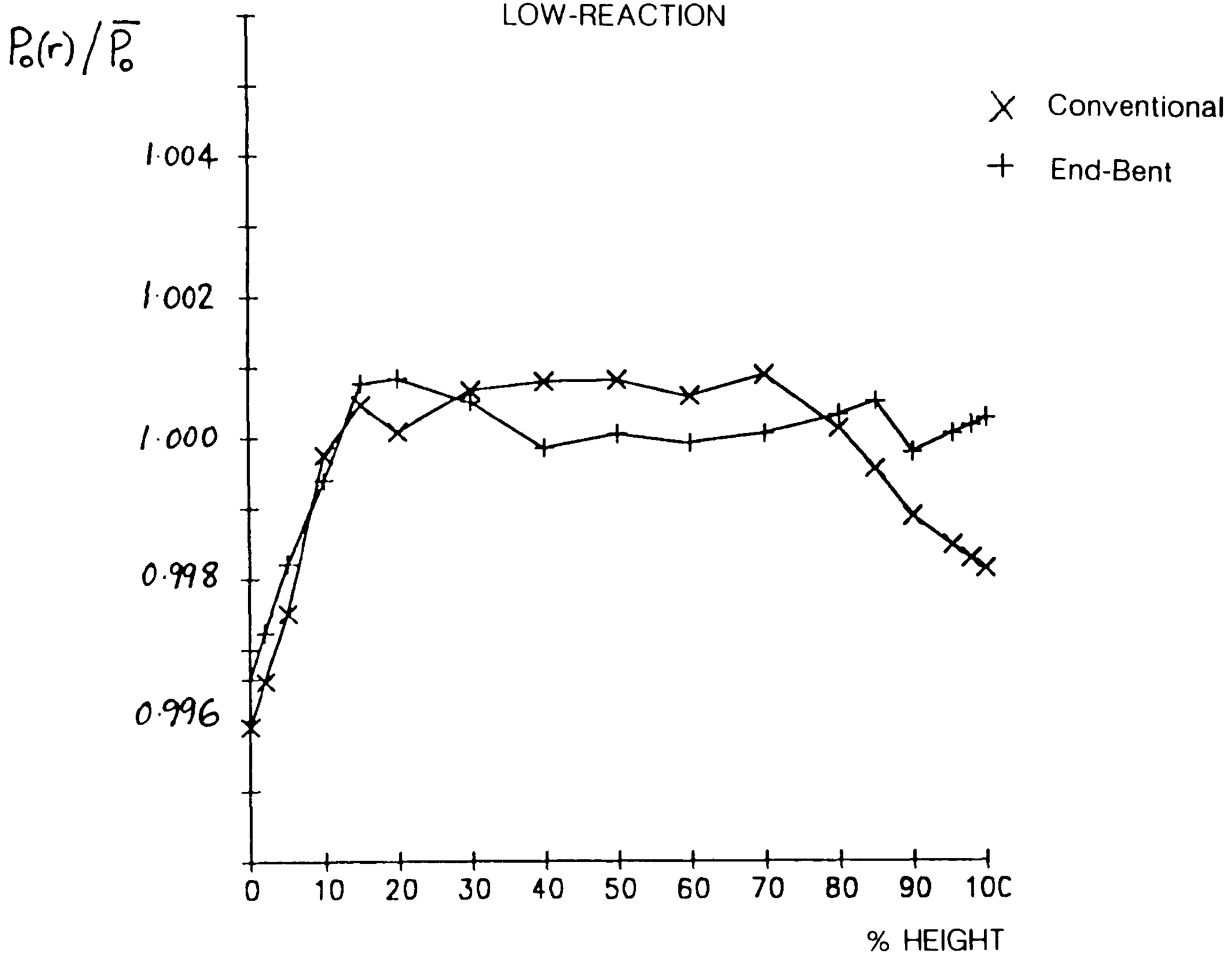
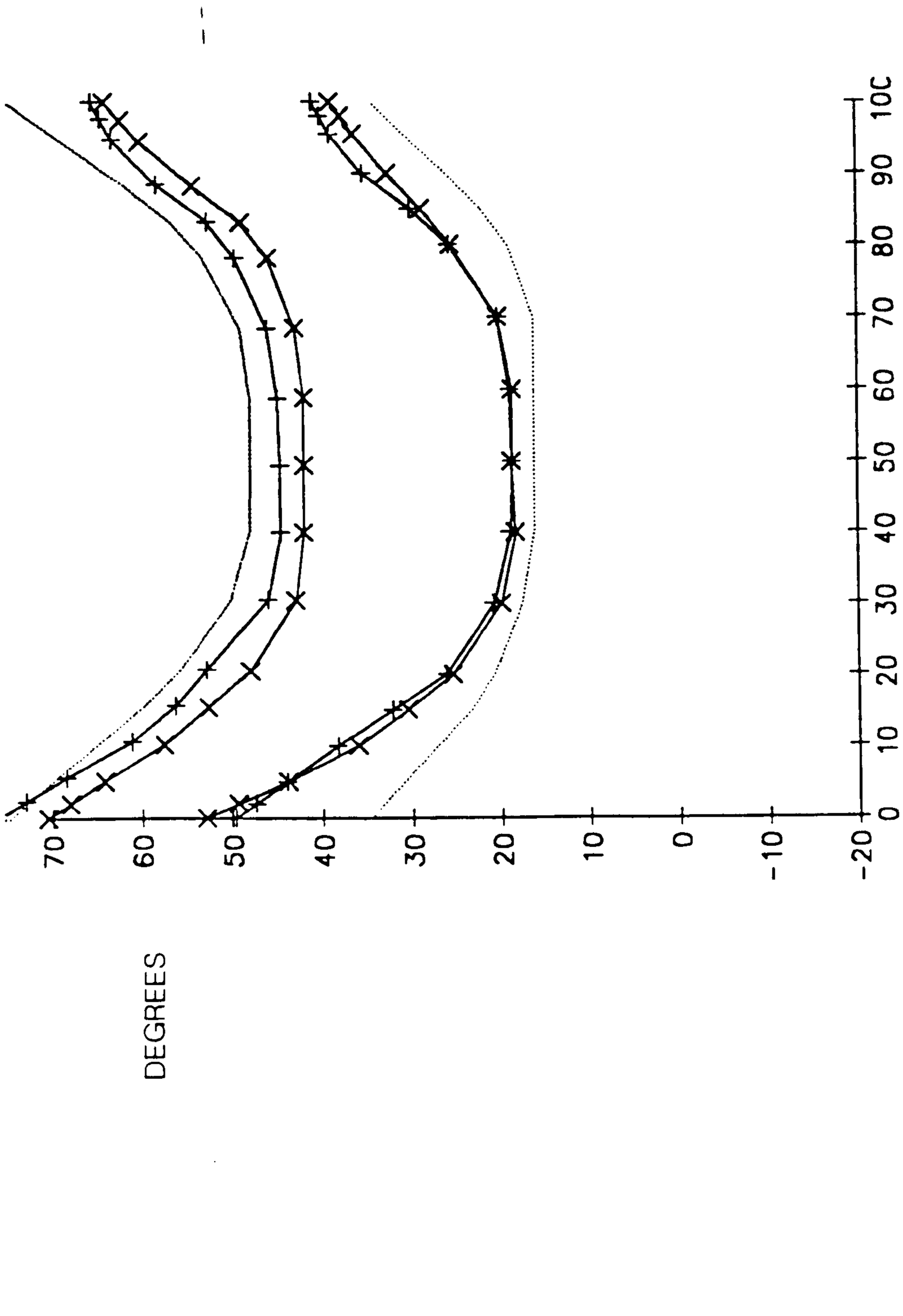


Fig 7.37

HUB : STATOR GAS ANGLES

X Peak Efficiency
\+ Near Stall
-- Blade Angles



LOW REACTION IEB

ROLLS ROYCE

Fig 7.38

LOW REACTION IEB : STATOR LOSSES

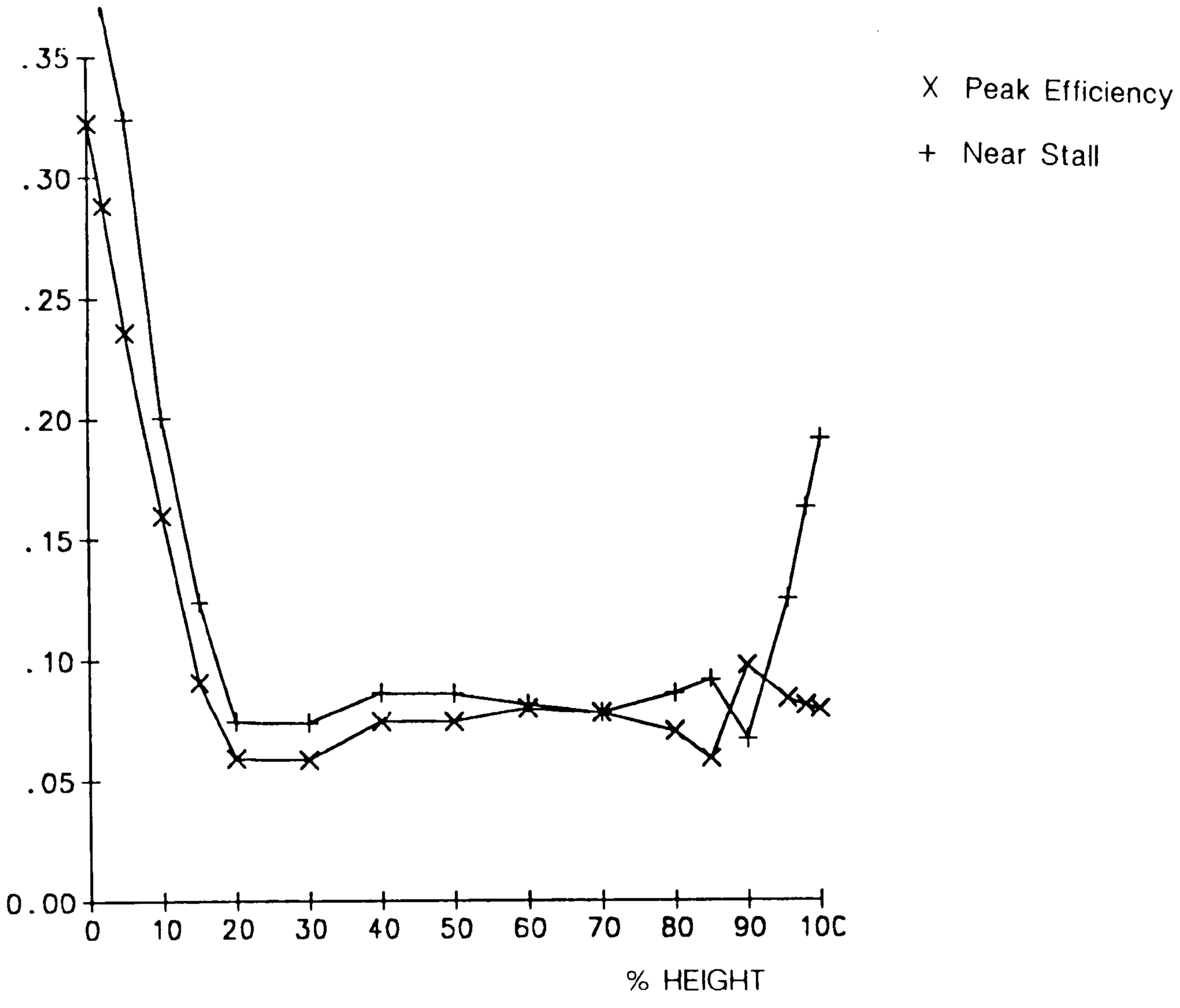


Fig 7.39

LOW REACTION IEB : ROTOR SURFACE STATICS

Peak Efficiency

ROTOR 2

Near Stall

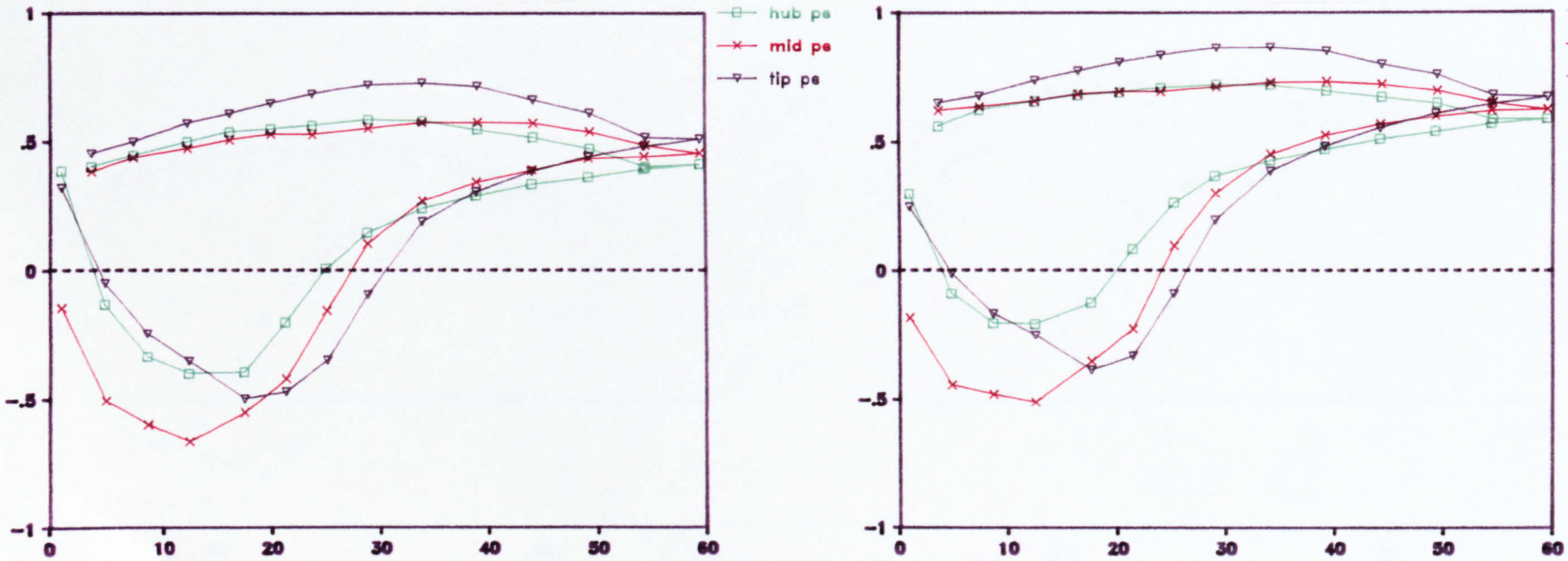


Fig 7.40

LOW REACTION IEB : STATOR SURFACE STATICS

Peak Efficiency

STATOR 2

Near Stall

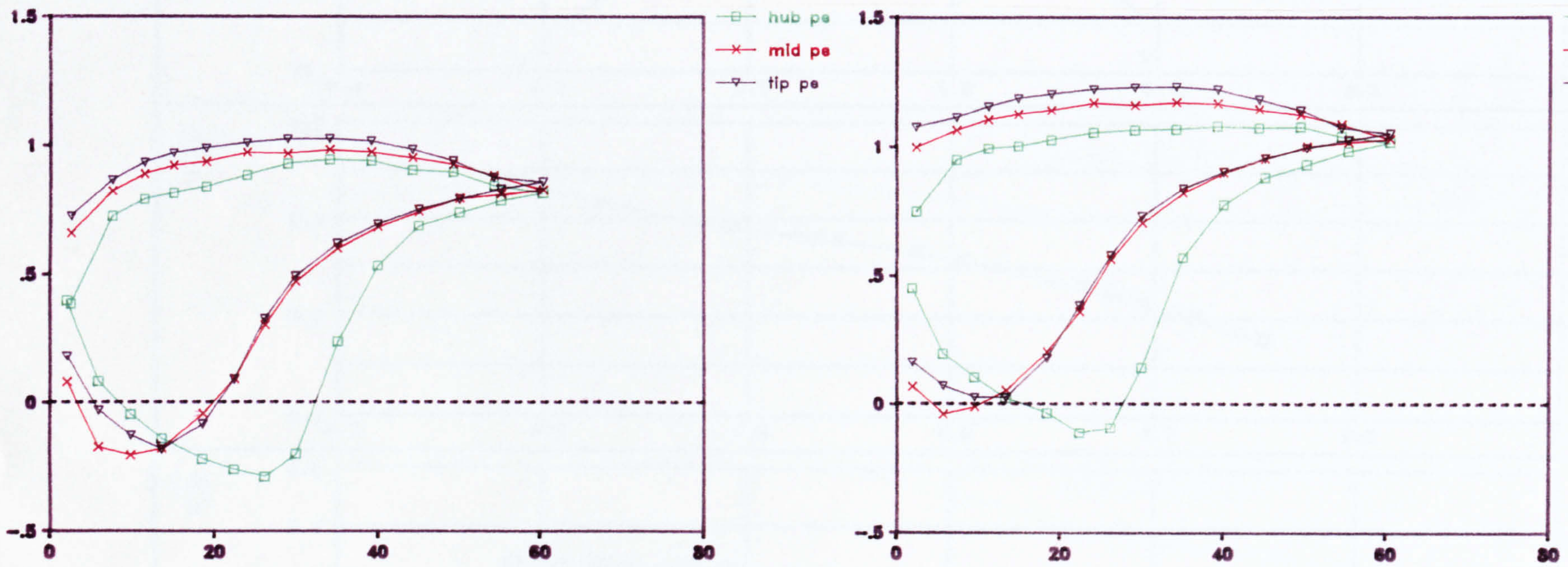


Fig 7.41

DCA DATUM : EFFECT OF COMPRESSOR SPEED ON MEAN STAGE PERFORMANCE

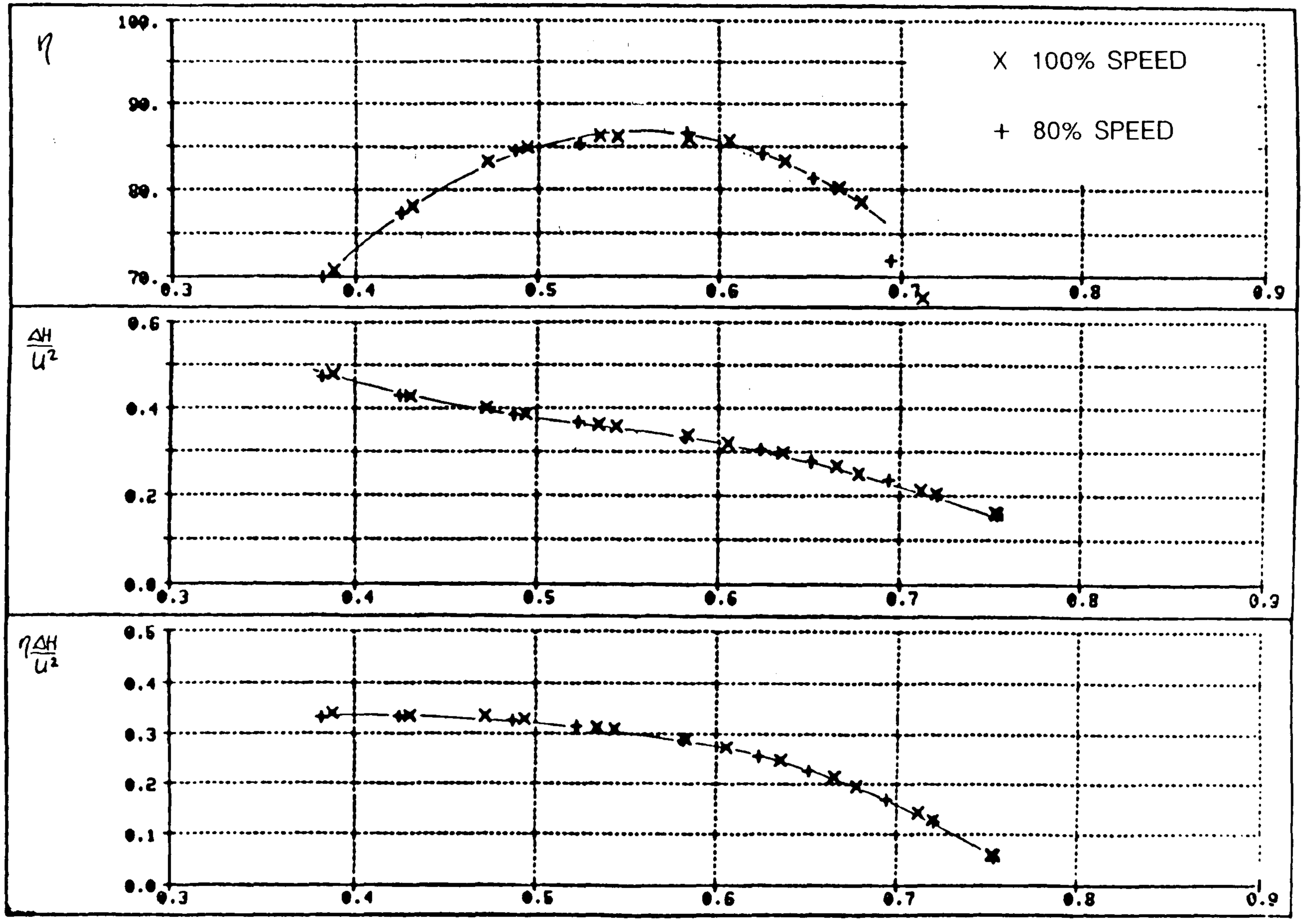


Fig 7.42

LOW REACTION DATUM AND IEB : AXIAL REACTION DISTRIBUTION

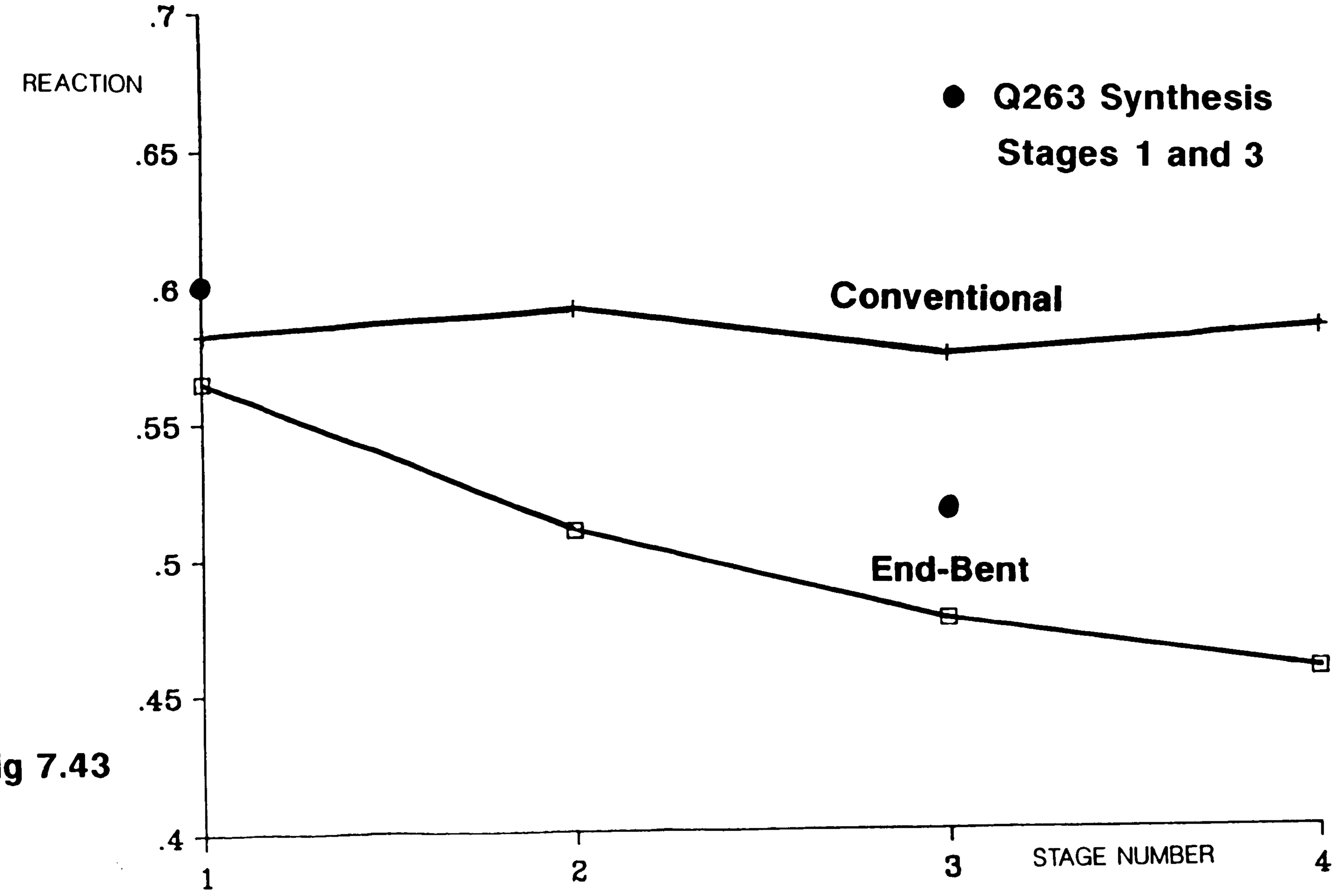


Fig 7.43

LOW REACTION DATUM AND IEB : ROTOR VELOCITY RATIOS

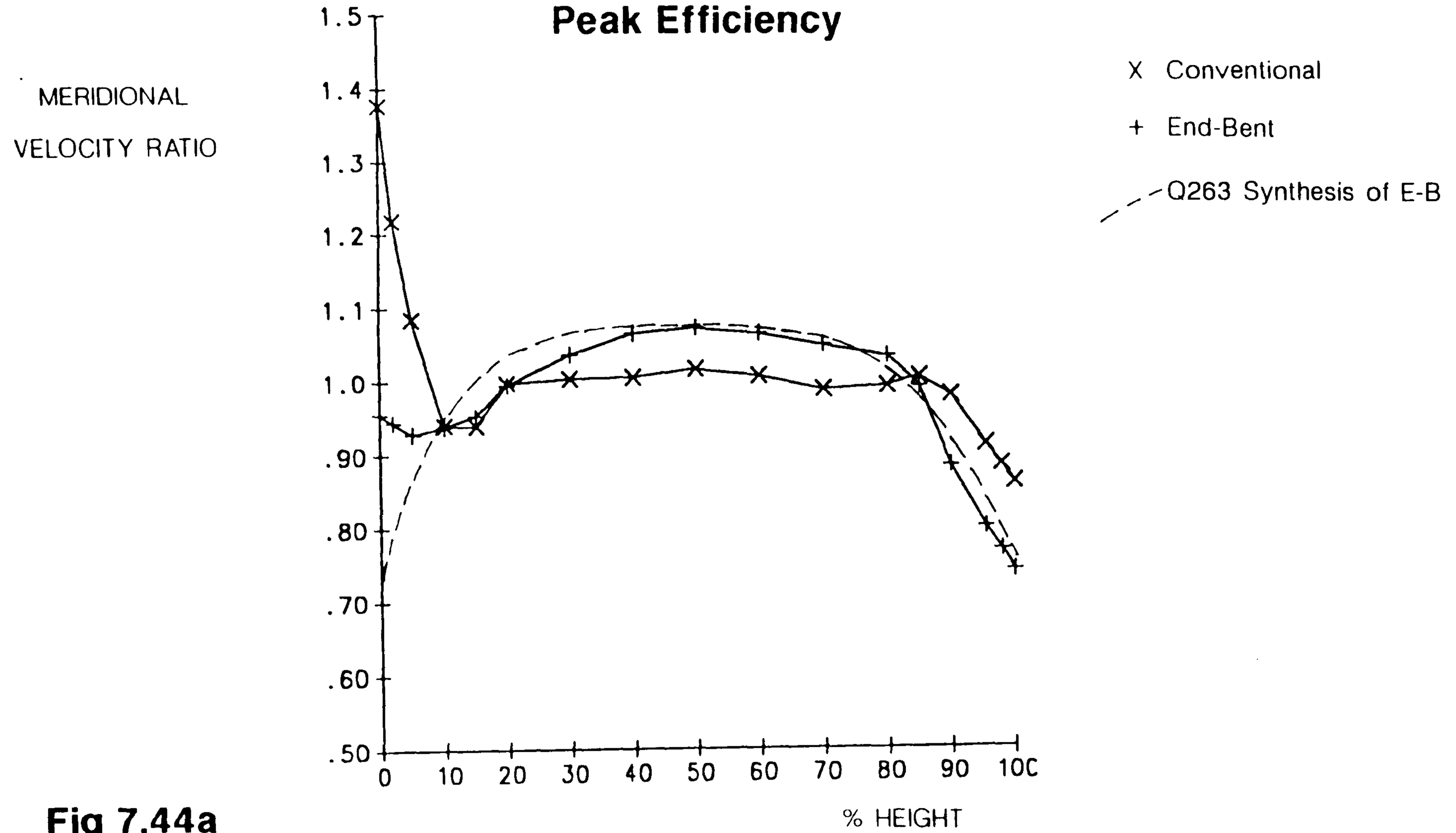


Fig 7.44a

LOW REACTION DATUM AND IEB : STATOR VELOCITY RATIOS

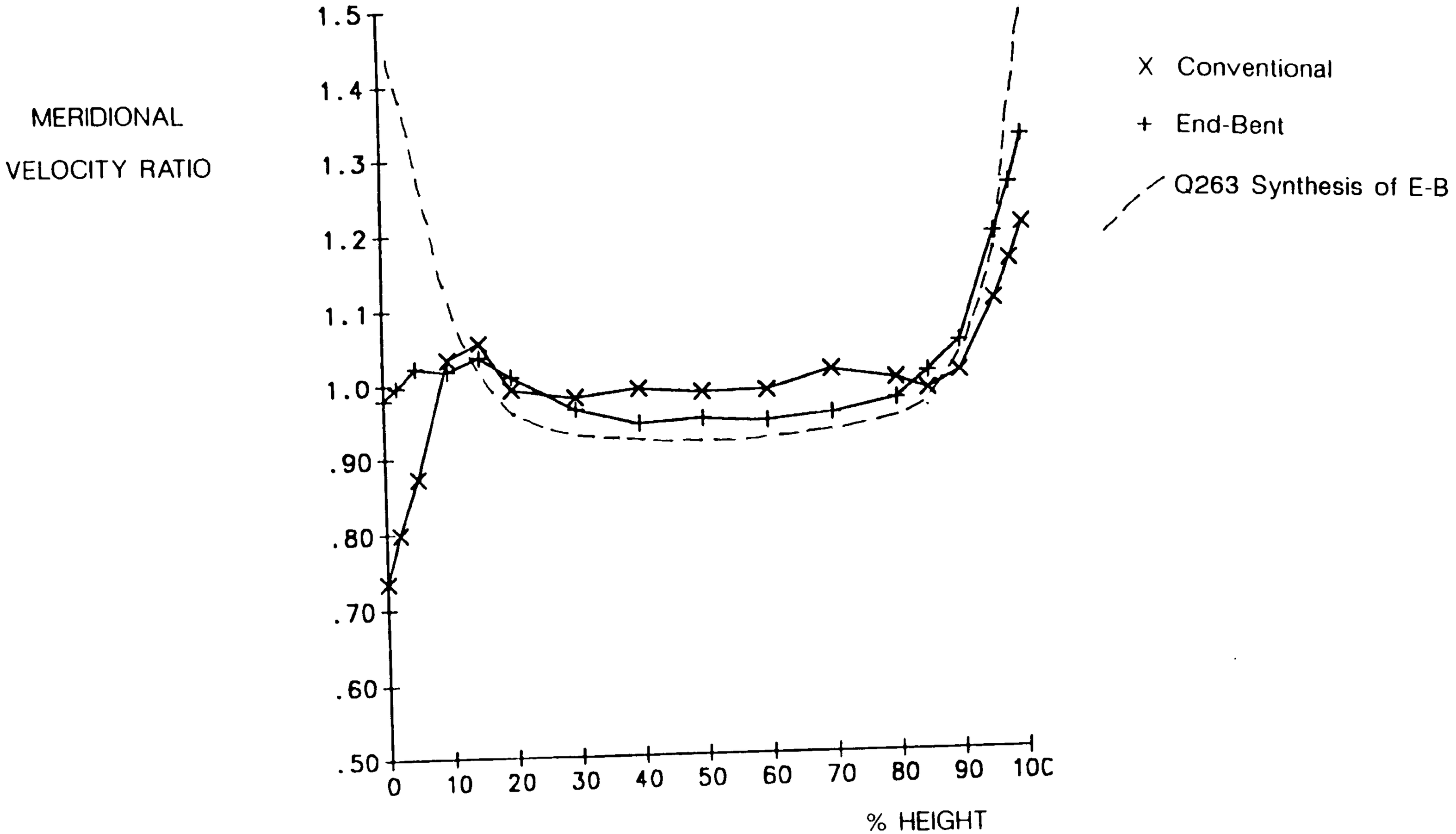
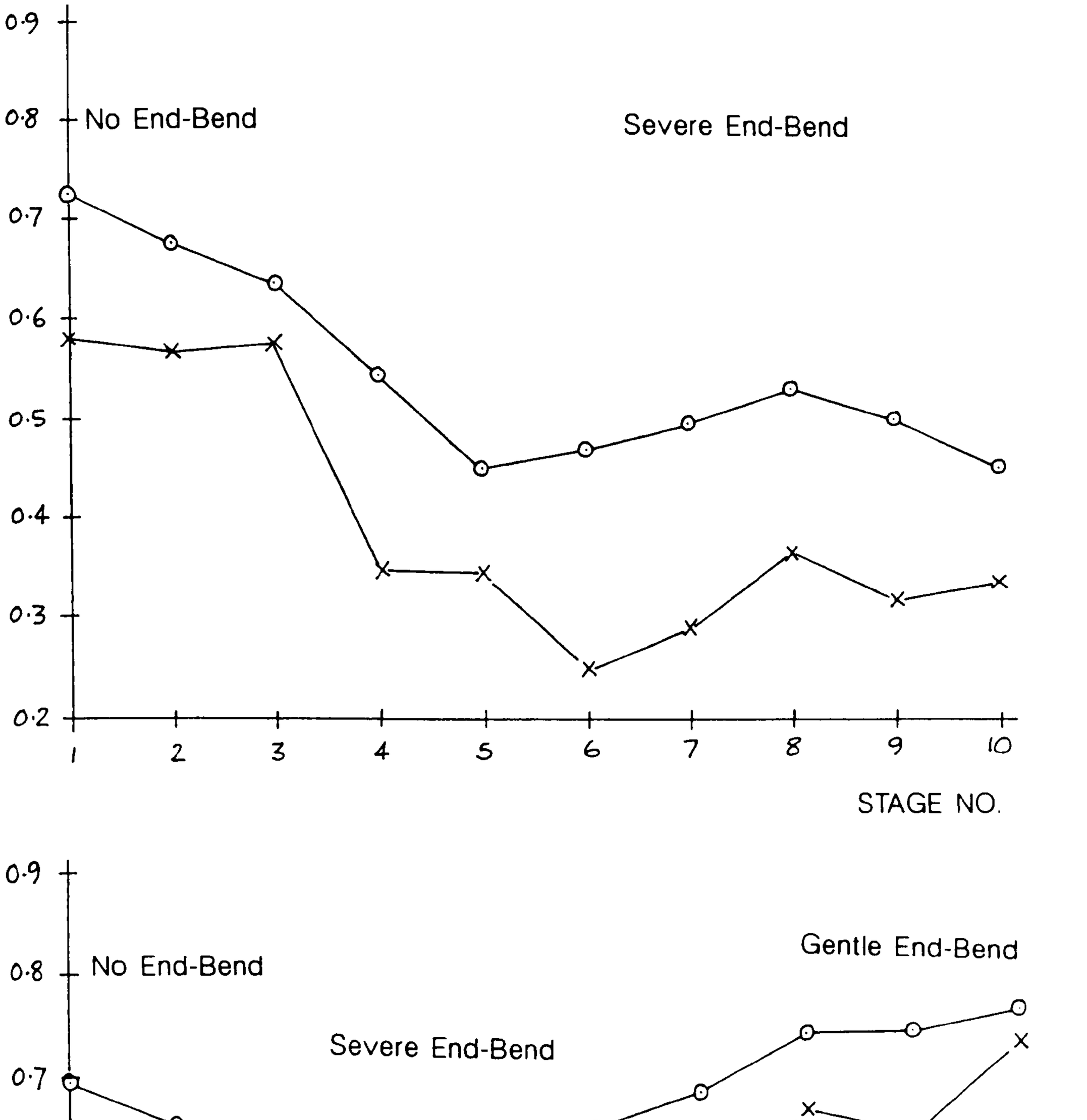
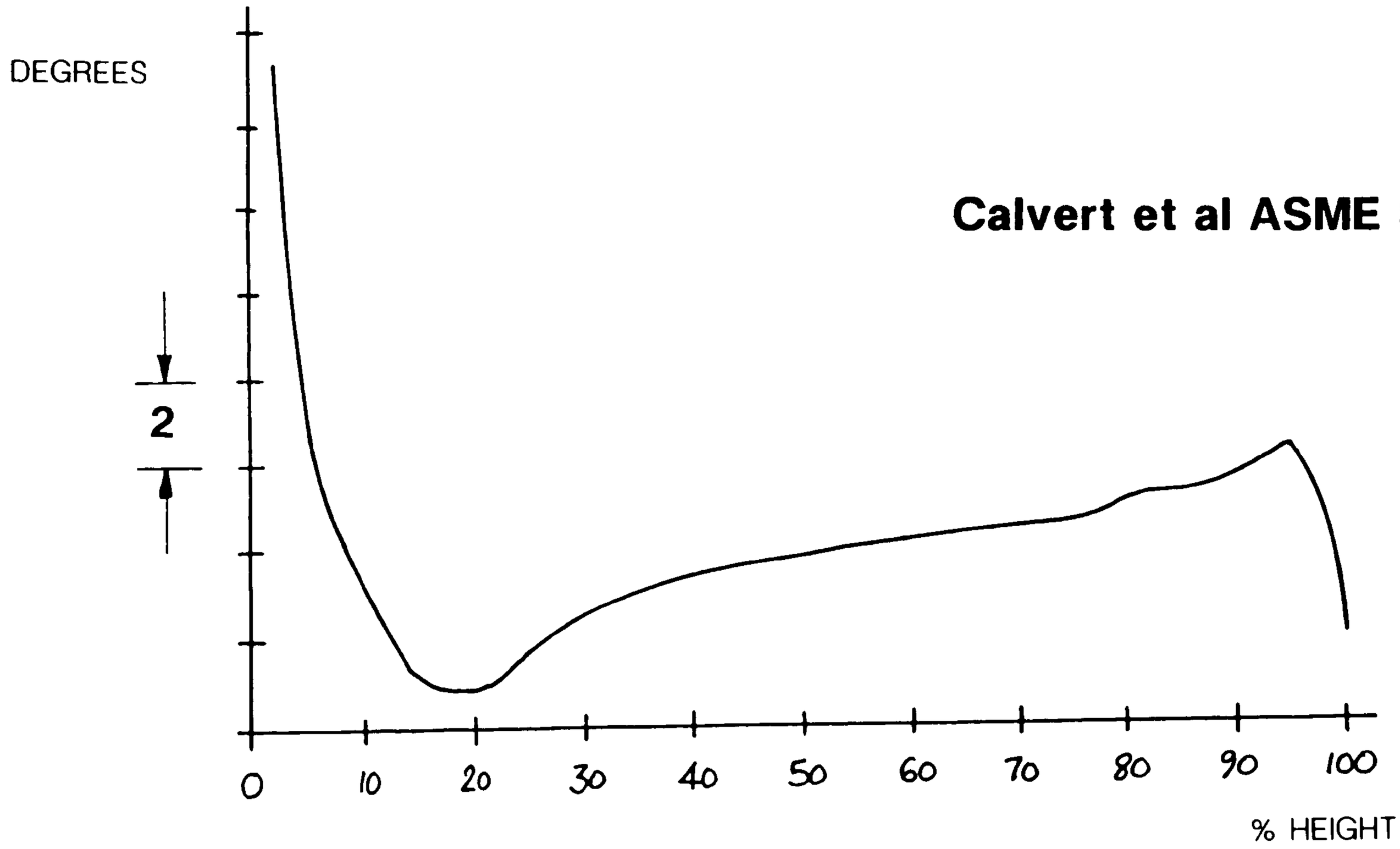


Fig 7.44b

Fig 7.45 V2500 STAGE REACTIONS



C147 STATOR 1 EXIT GAS ANGLES



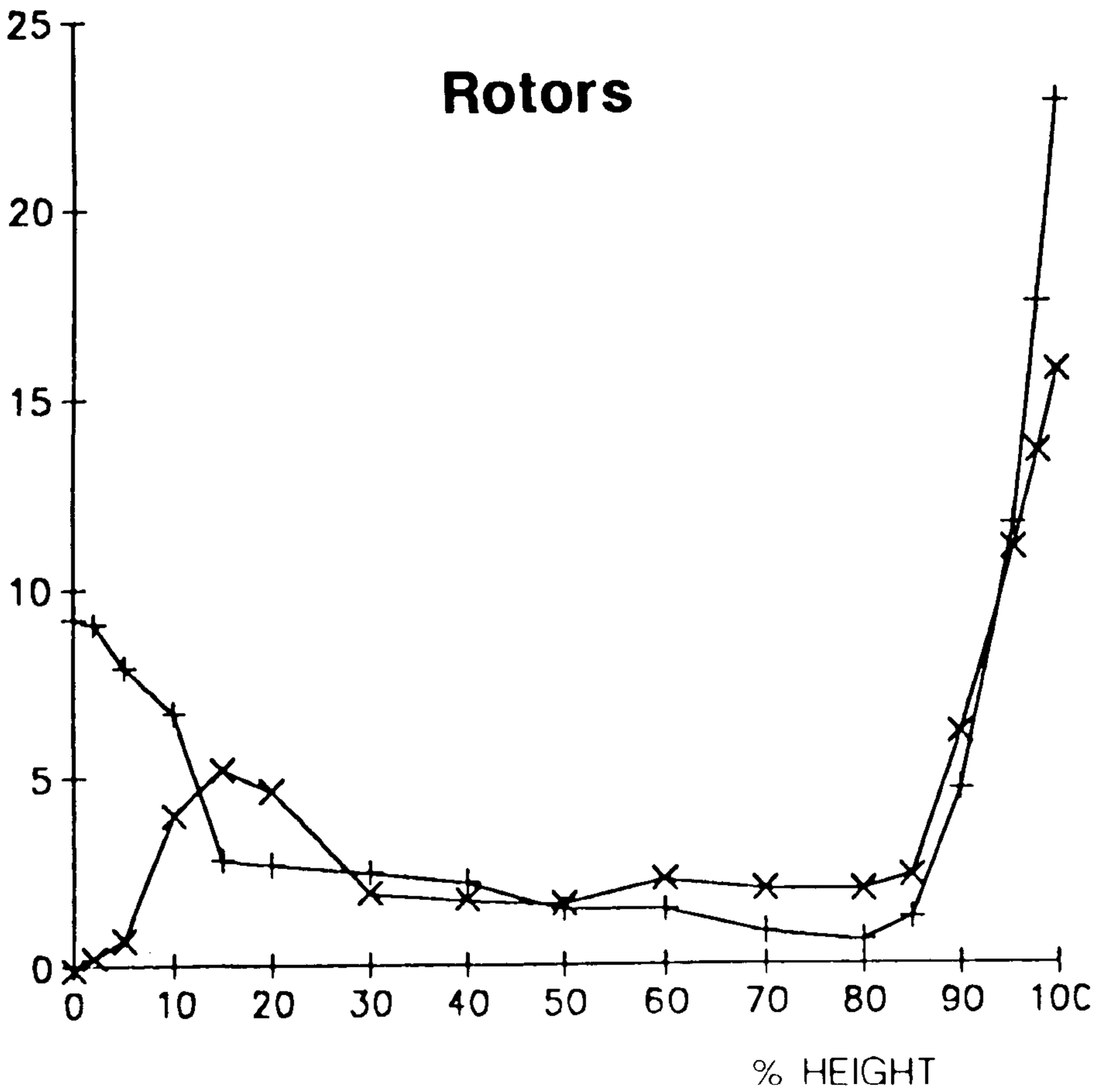
Calvert et al ASME 89-GT-24

Fig 7.46

COMPARISON BETWEEN ROTOR AND STATOR DEVIATIONS

Low Reaction Blading

Peak Efficiency



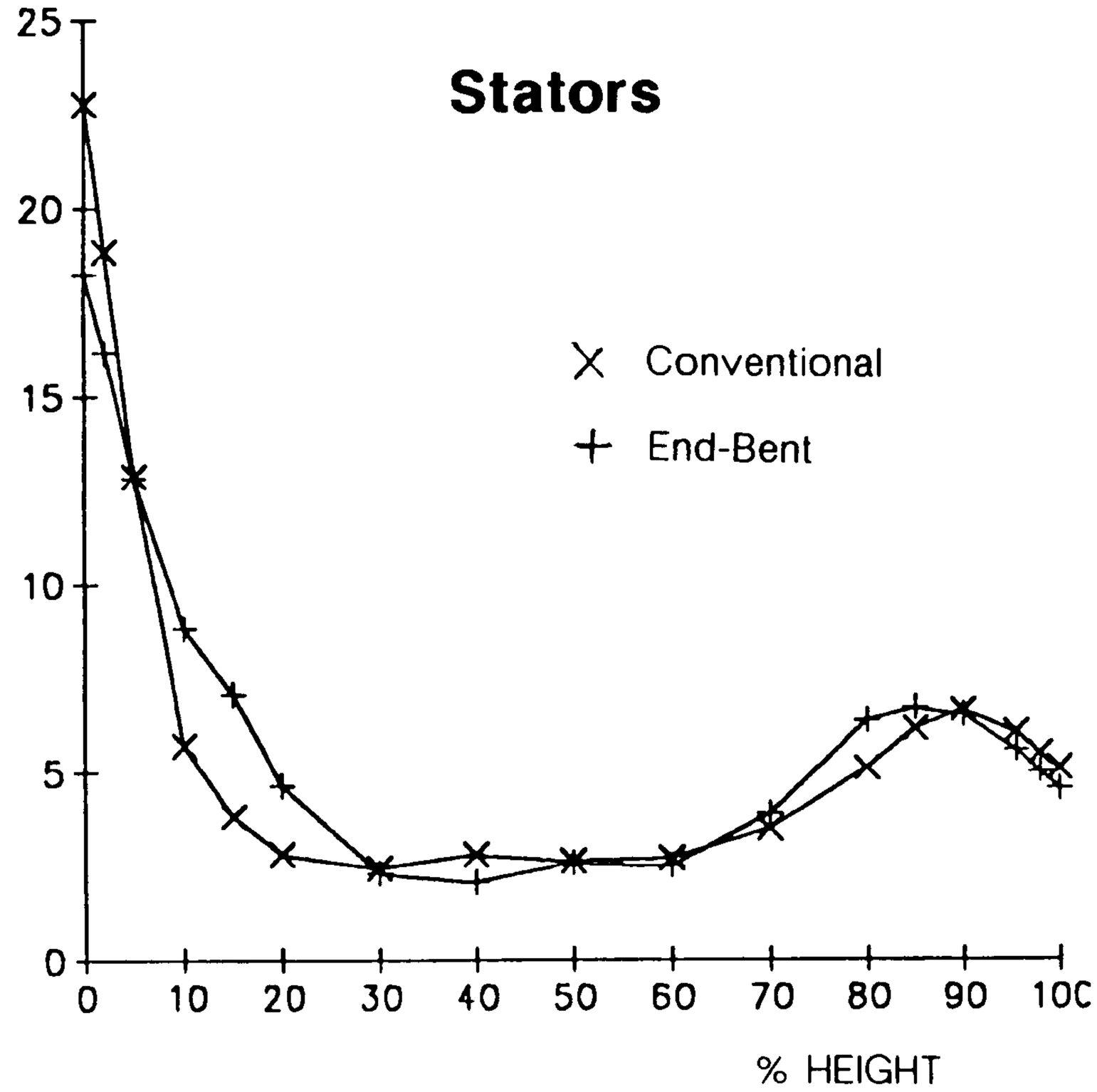
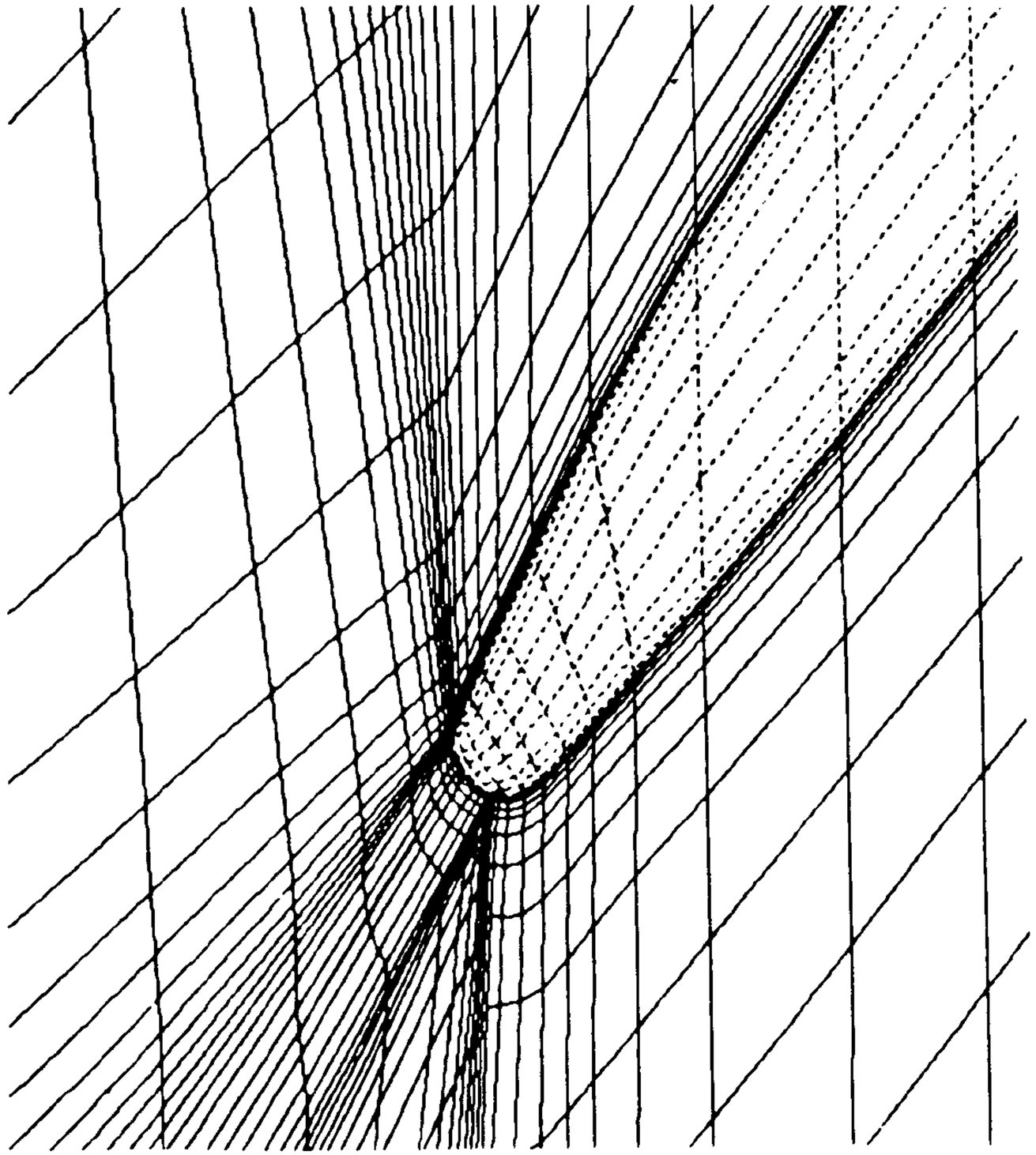


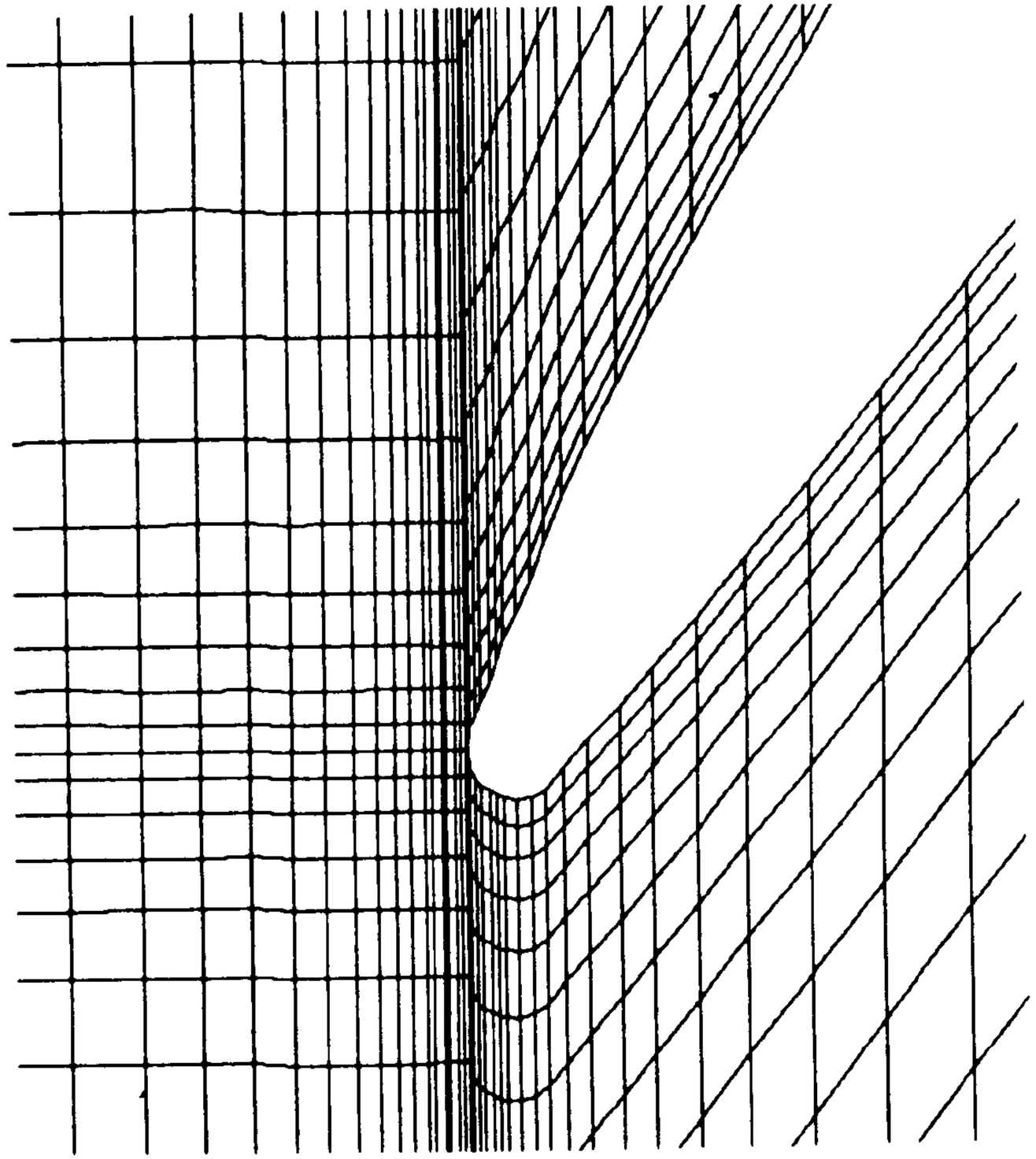
Fig 7.47

COMPARISON OF CFD MESH STYLES

Blade-to-Blade Plane



Curvilinear

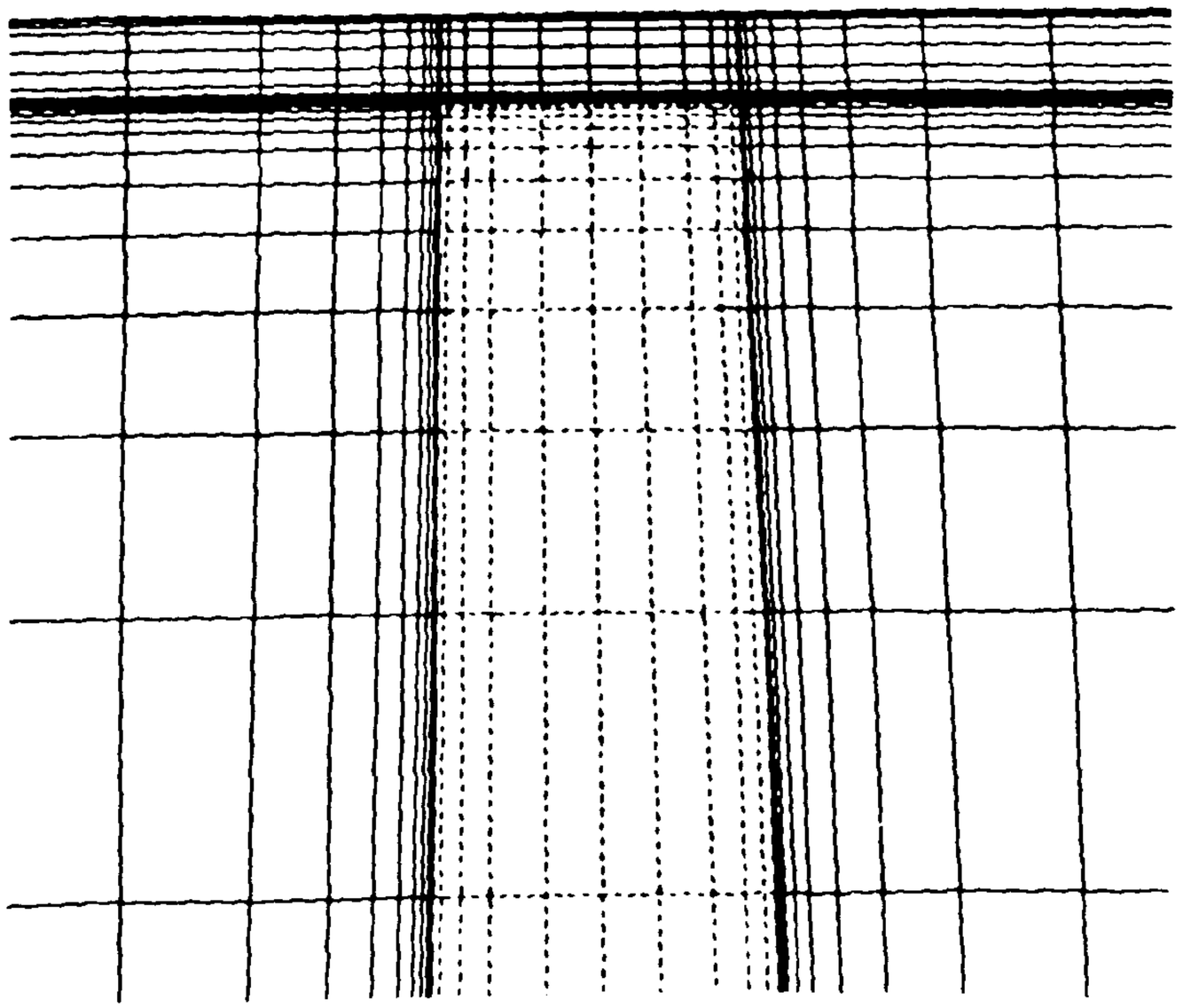


Sheared-H

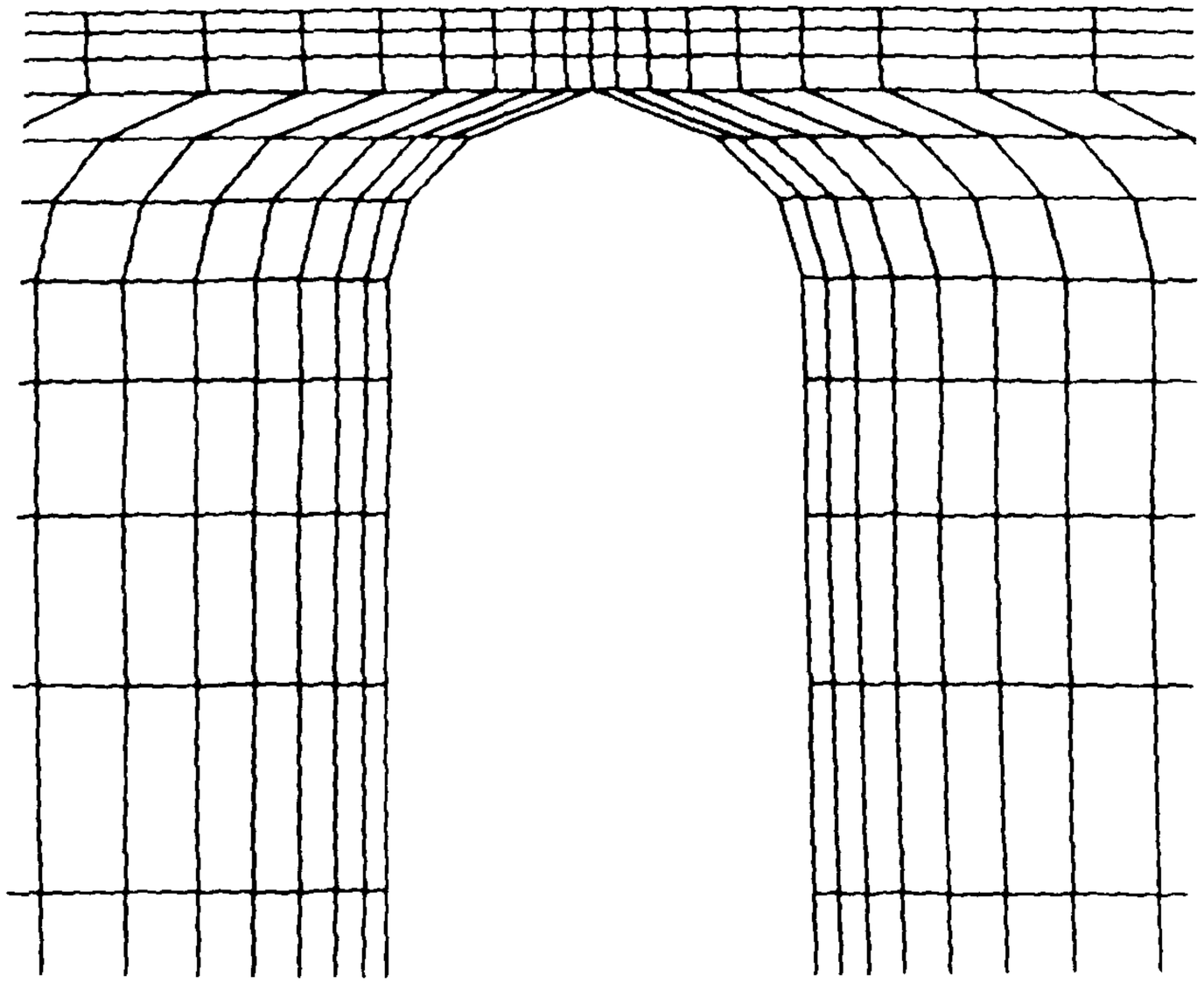
Fig 8.1

COMPARISON OF CFD MESH STYLES

Tip Clearance Detail



Curvilinear



Sheared-H

Fig 8.2

VELOCITY VECTORS PREDICTED BY 3D VICTA

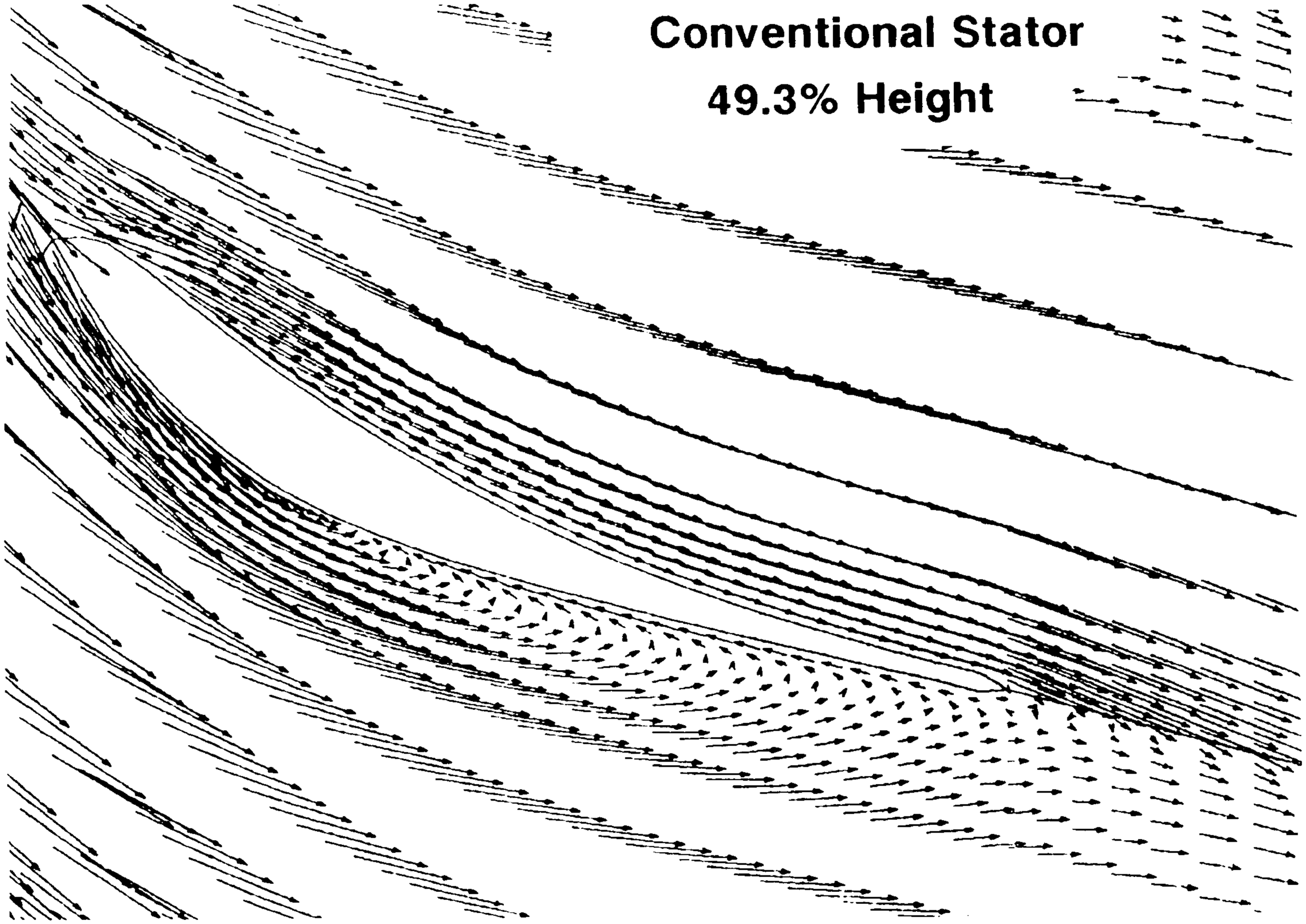


Fig 8.3

DEALING WITH NON-MONOTONIC SUCTION SURFACES

End-Bent Stator
Hub Plane Section

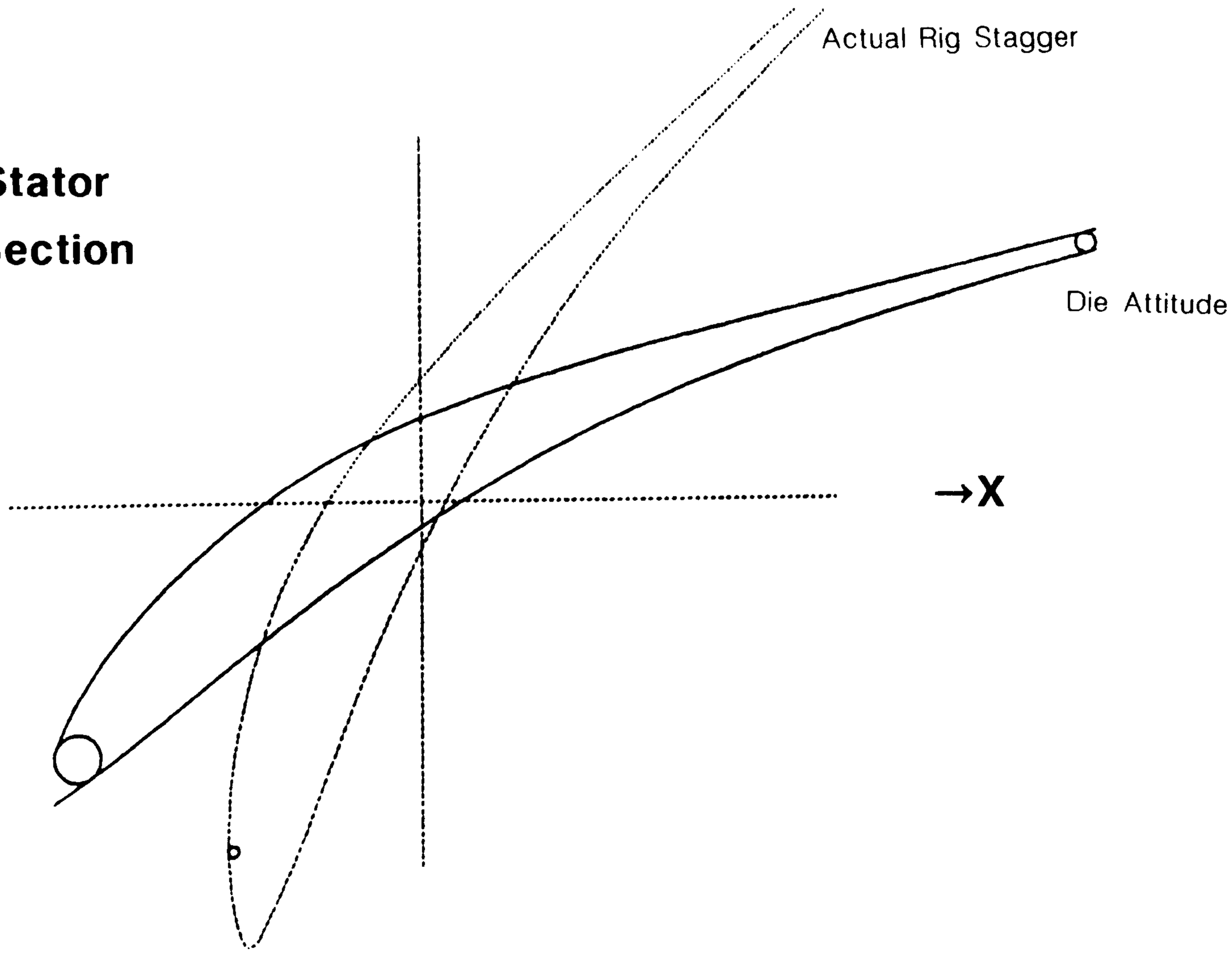
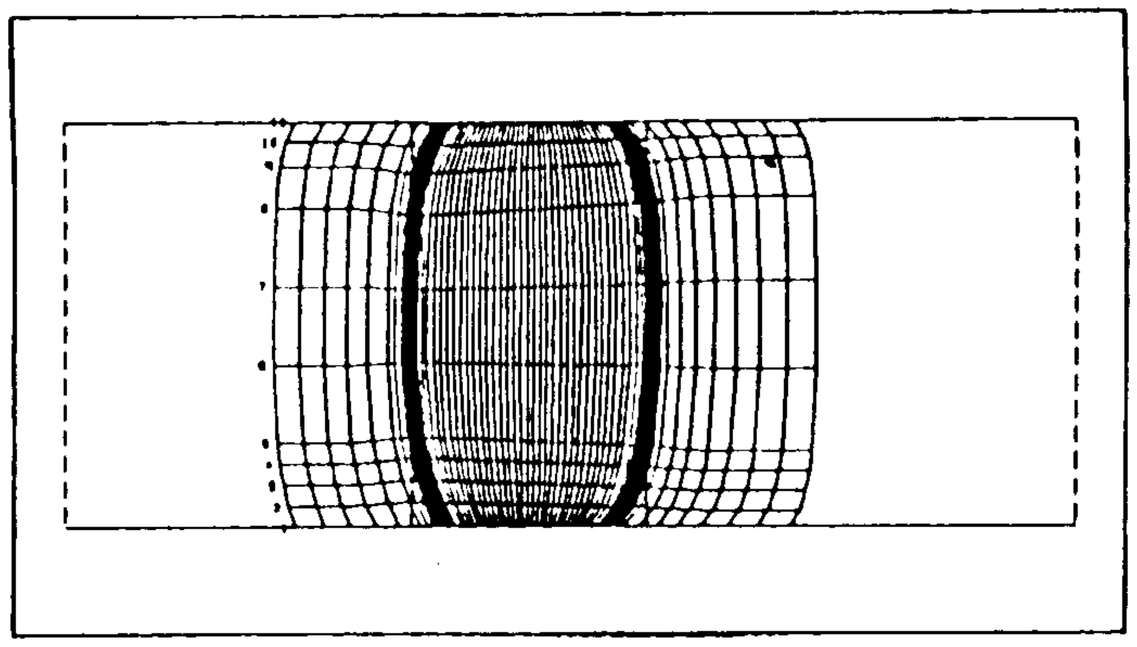
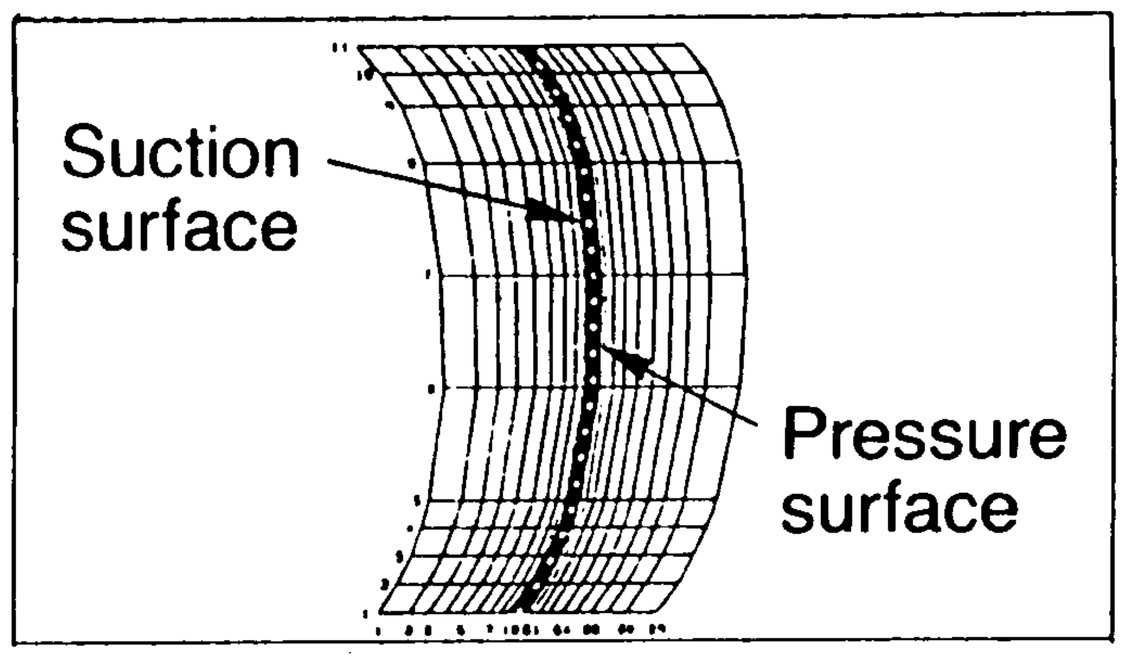


Fig 8.4

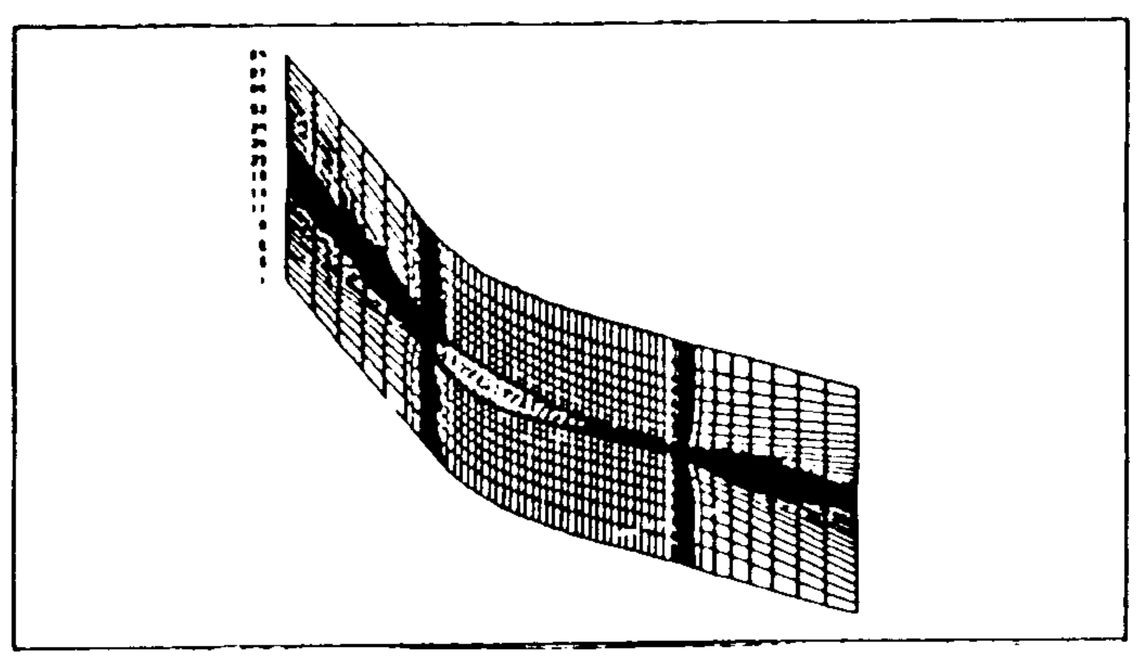
Calculation mesh for end-bend stator



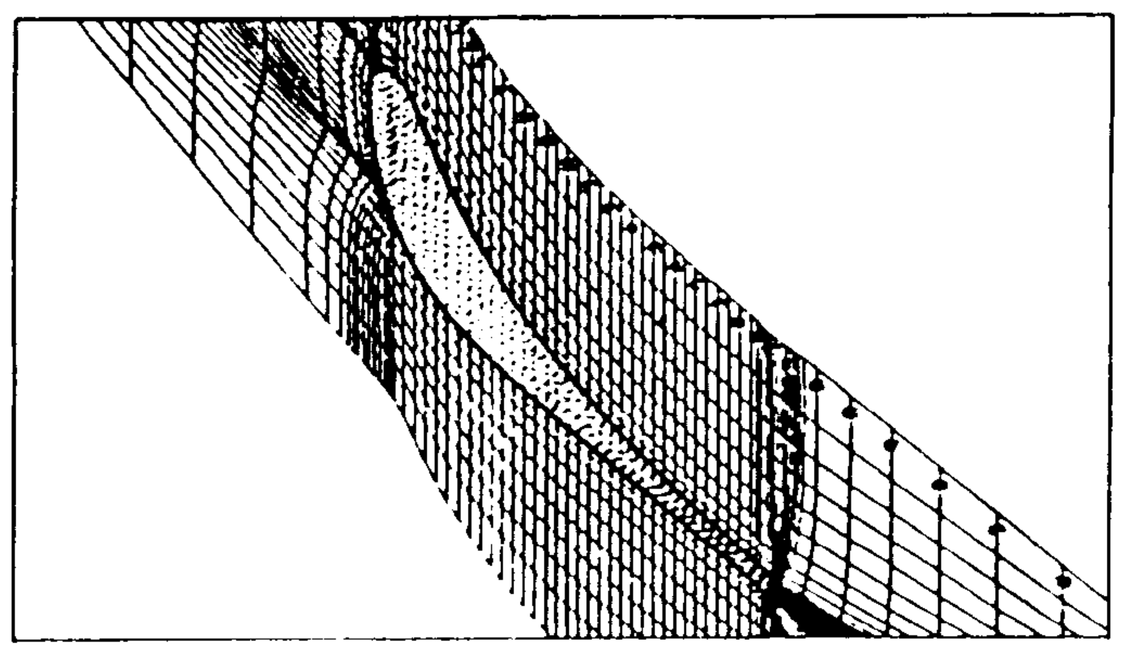
Meridional view



Hub-tip view
(looking at trailing edge)



Mid-height



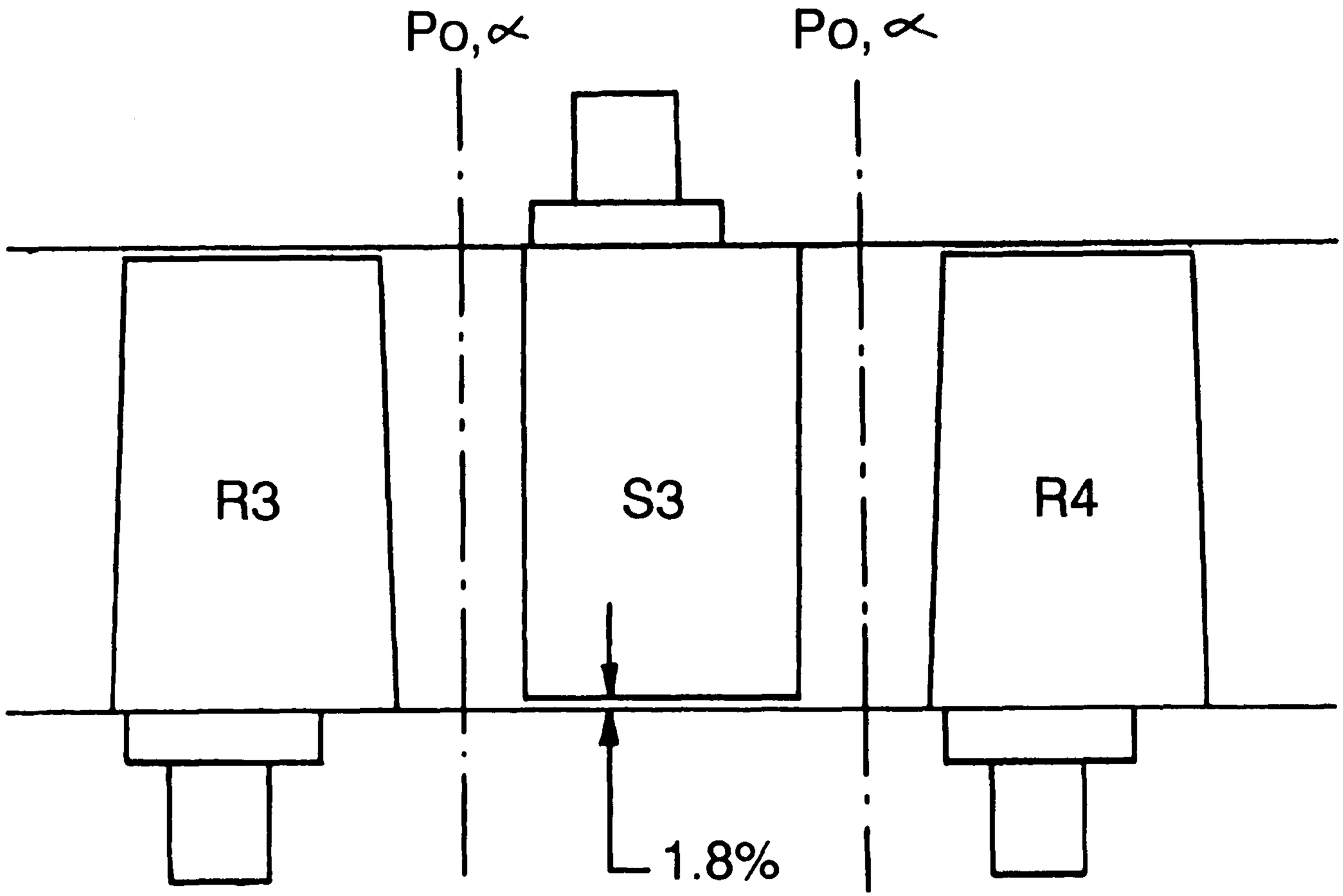
Near end-walls

Blade-to-blade

Fig 8.5

VML 52601

EXPERIMENTAL ARRANGEMENT



Conventional Stage Illustrated

Fig 8.6

VML 52592

CONVENTIONAL STATOR
EXIT GAS ANGLES

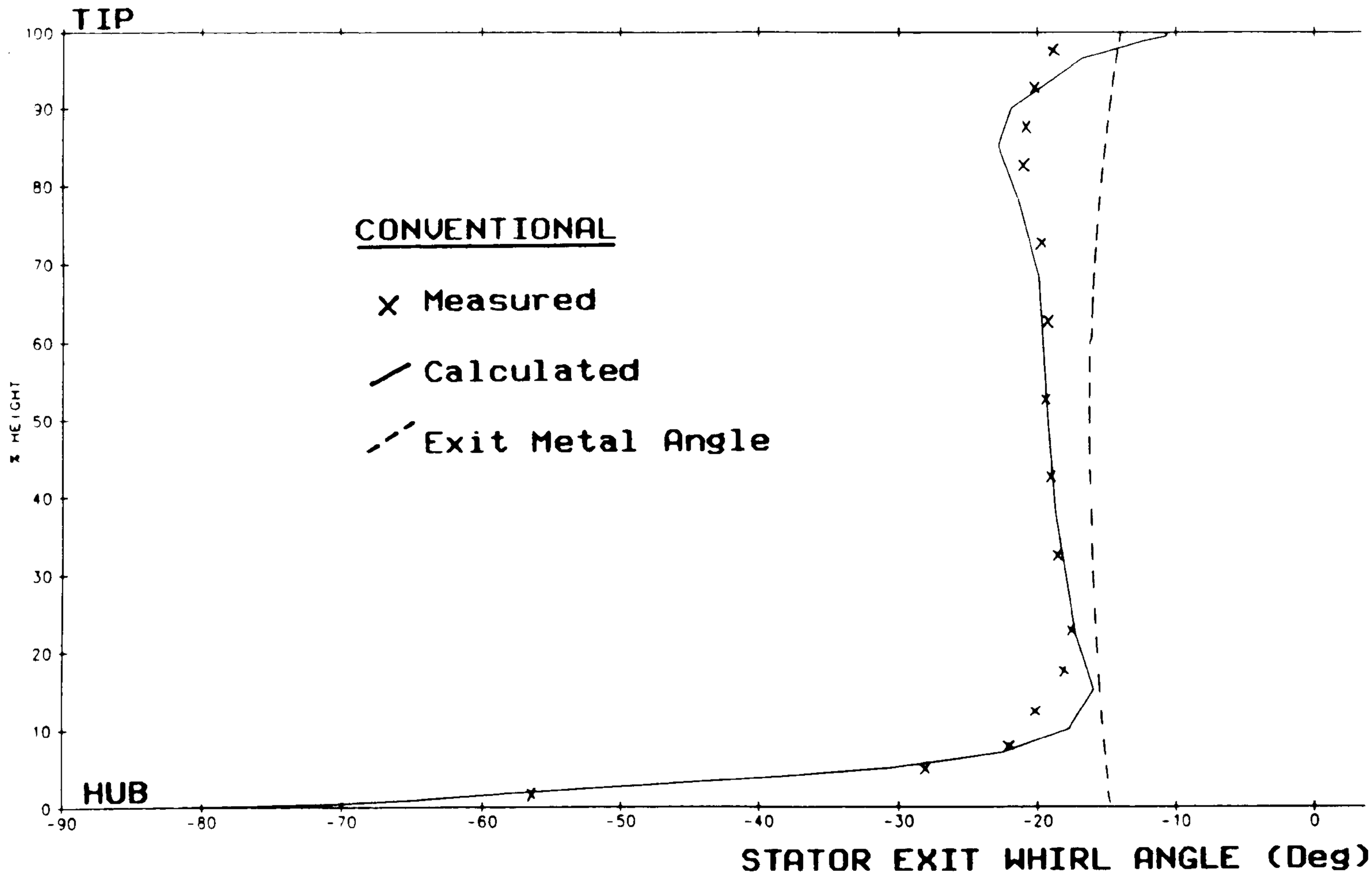


Fig 8.7a

END-BENT STATOR
EXIT GAS ANGLES

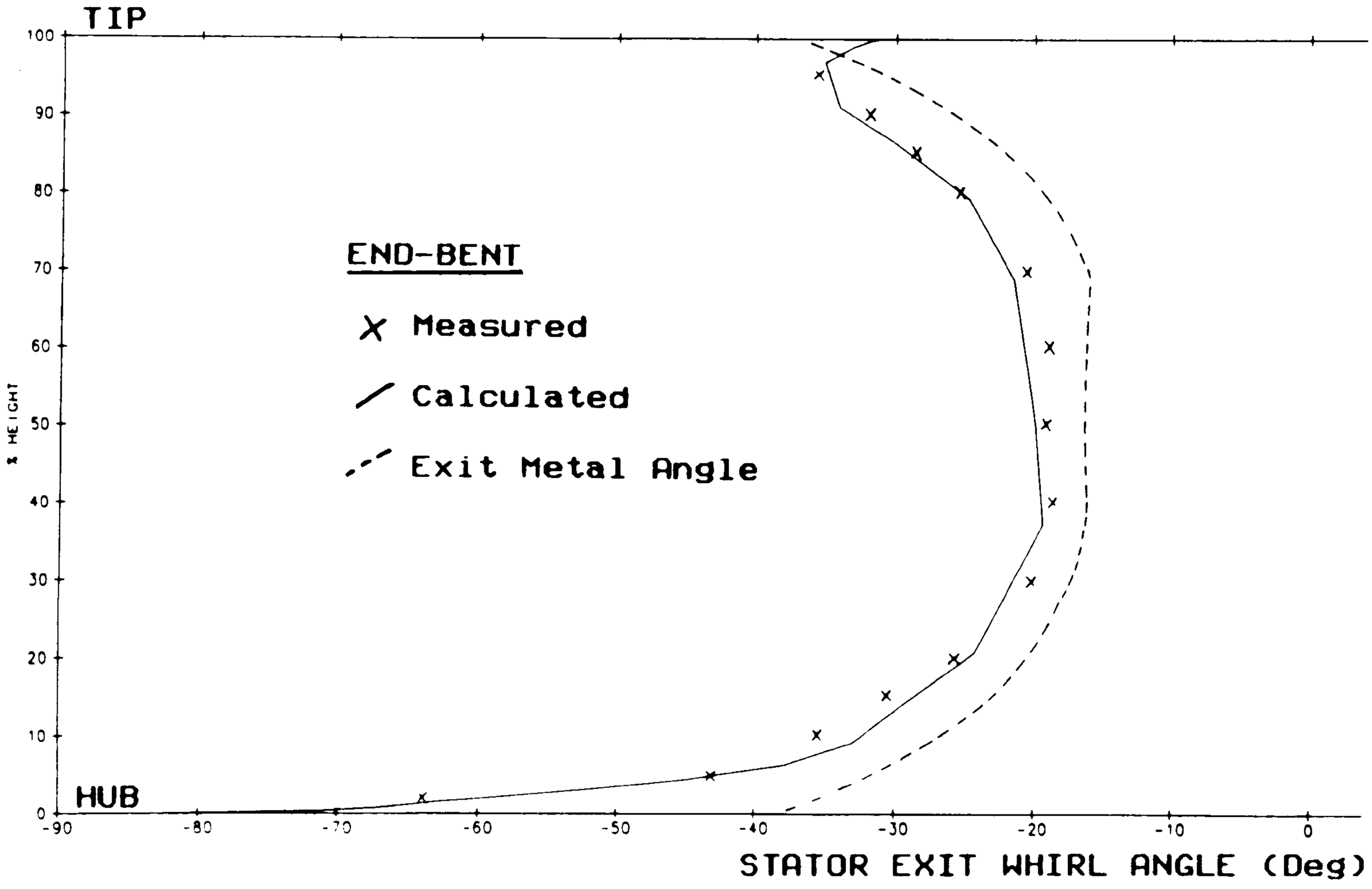


Fig 8.7b

Comparison between measured and calculated stator loss coefficients

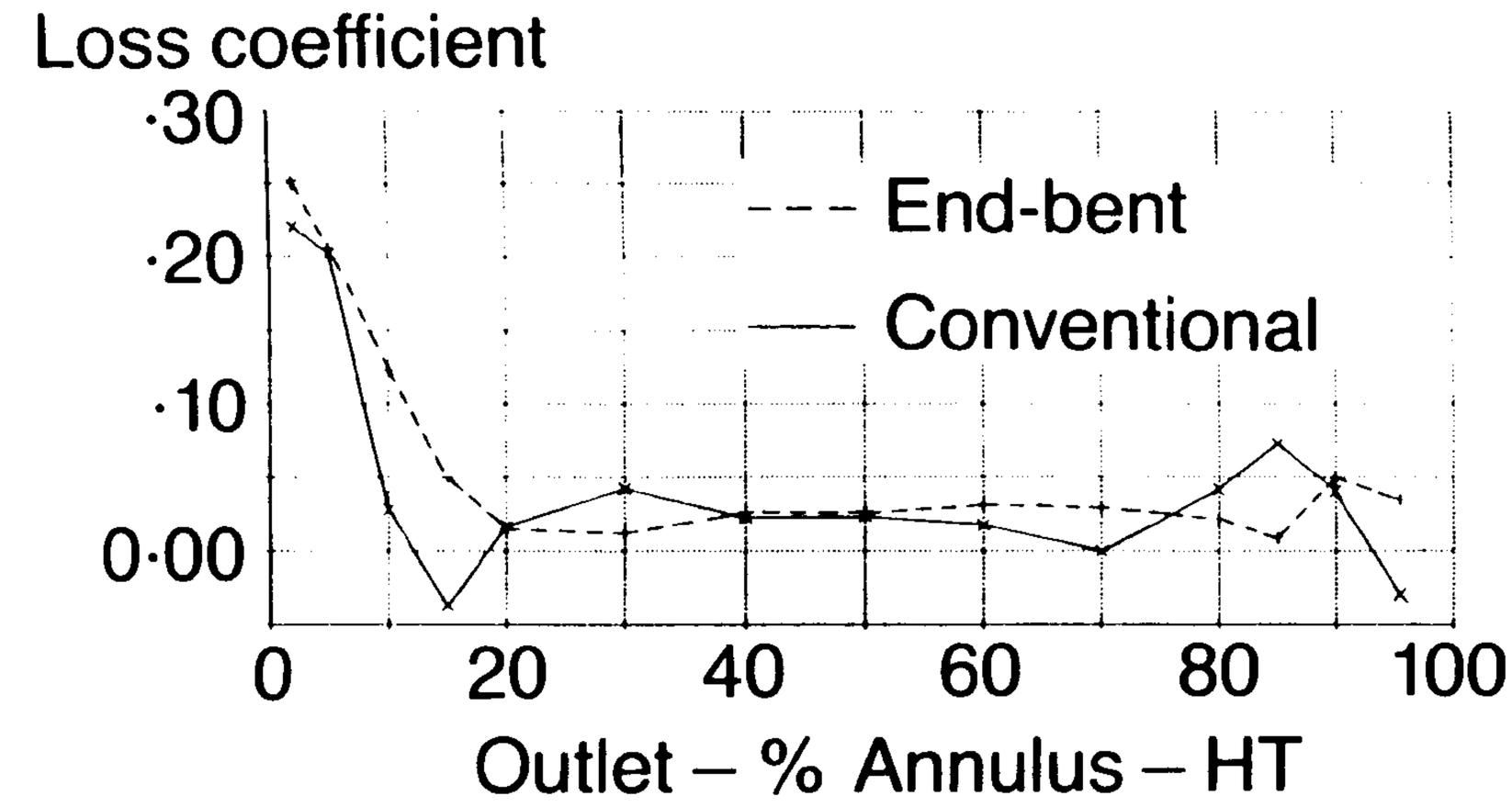


Fig 8.8

VML 52604

AXIAL DISTRIBUTION OF TOTAL PRESSURE

Conventional Stator, Free-Stream Only

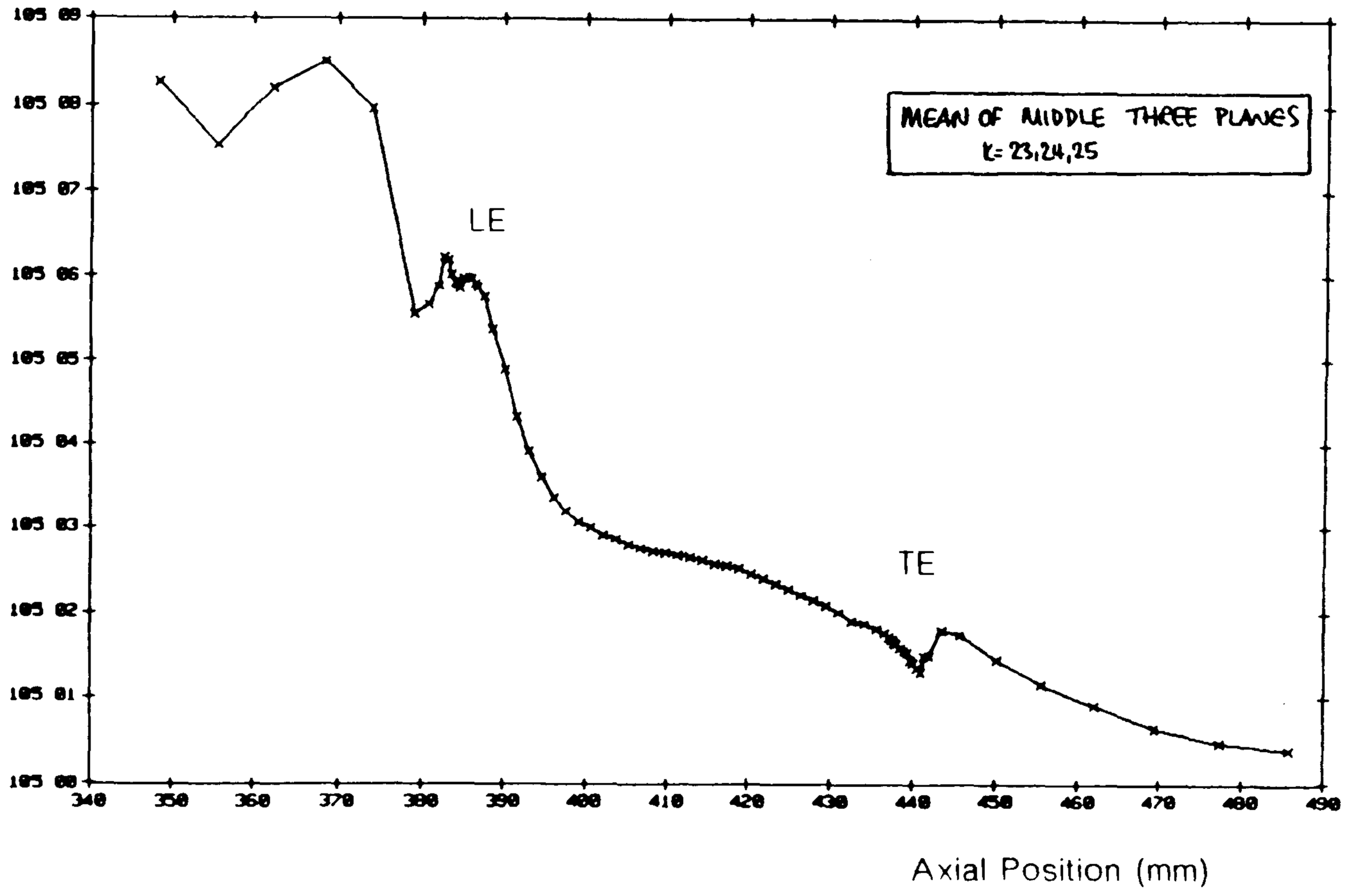
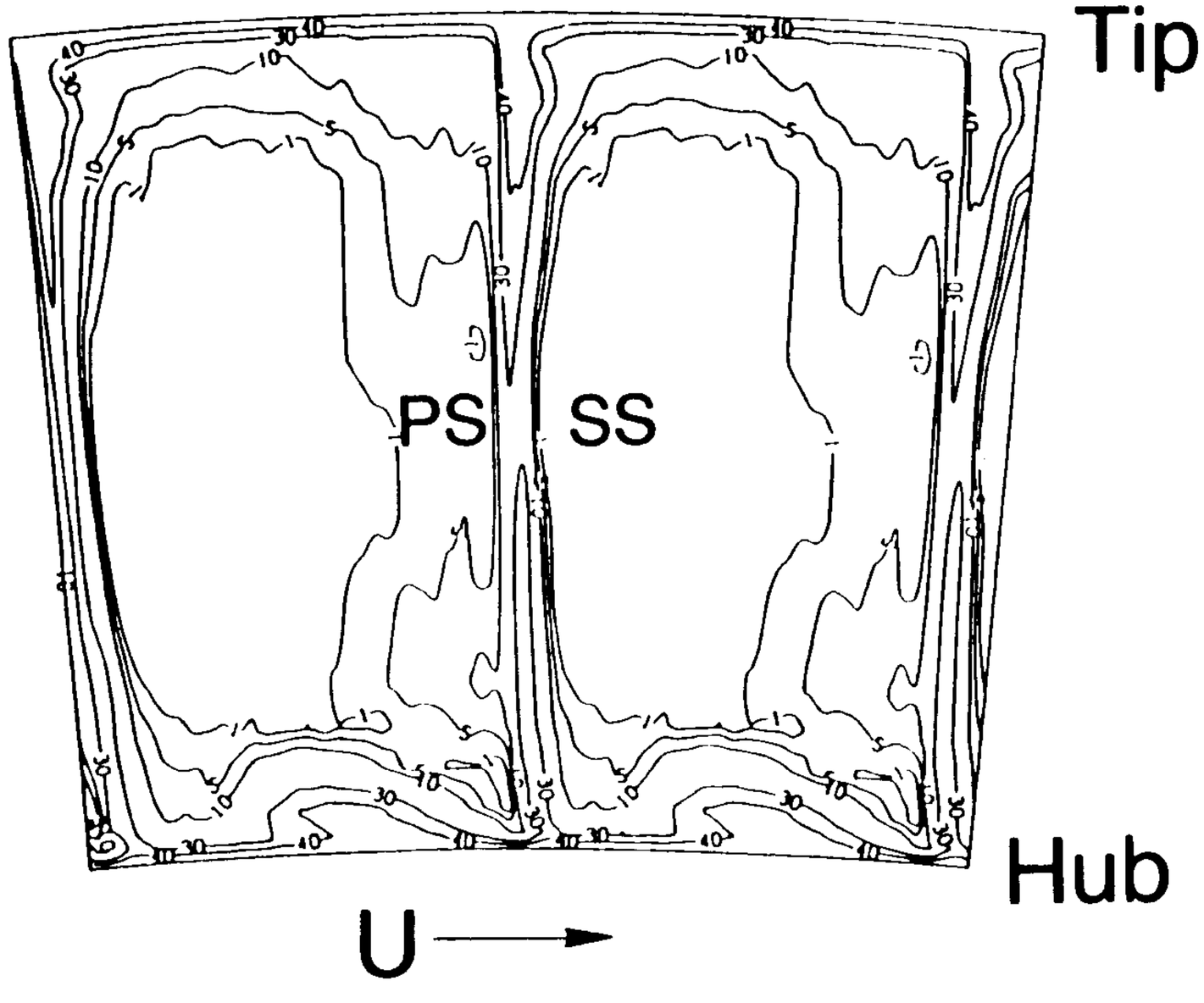
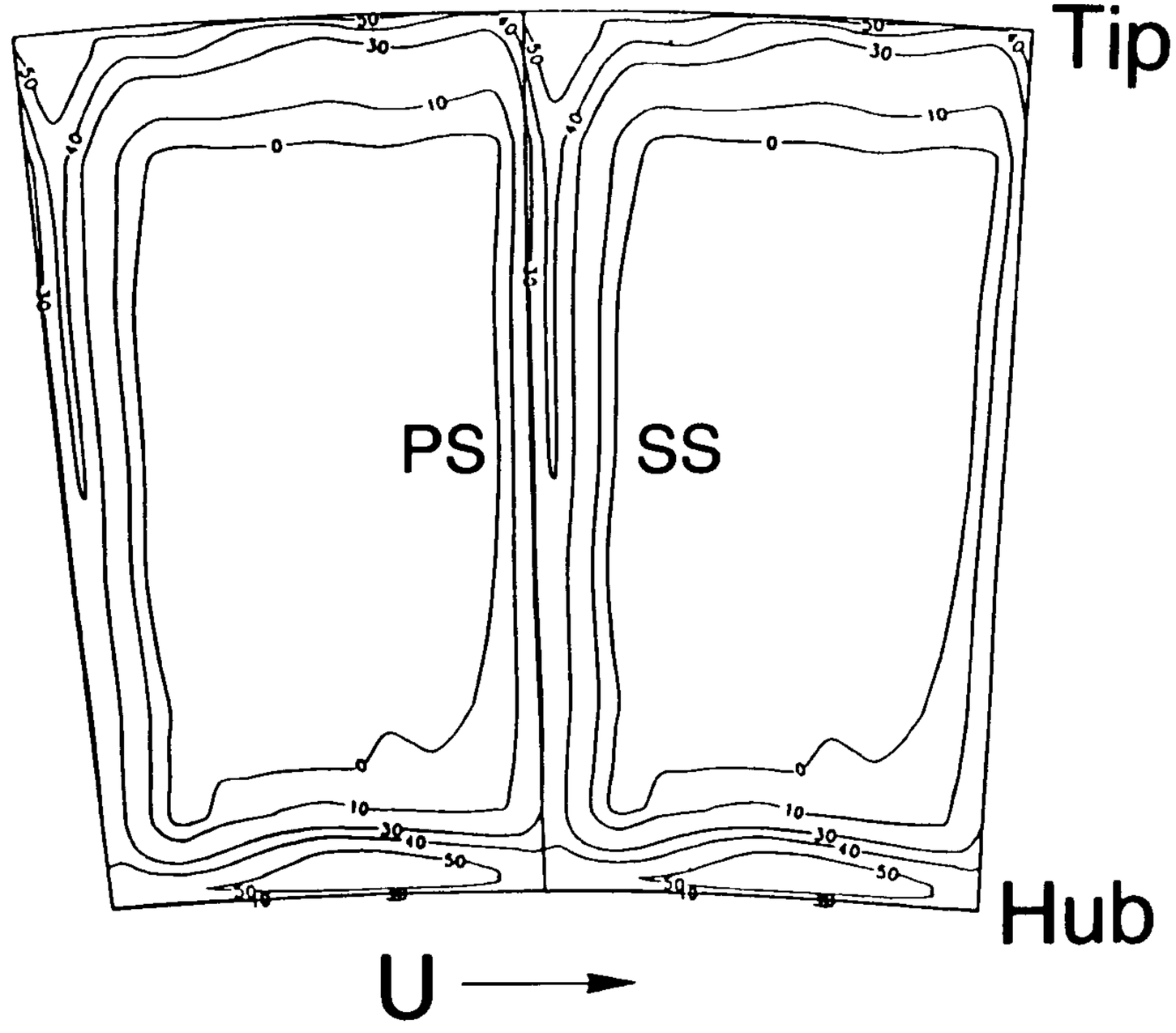


Fig 8.9

Conventional stator exit total pressure contours $\left[\frac{\bar{P}_{01} - P_{02}}{\bar{P}_{01} - \bar{p}_1}\right]$



a) **Test data**



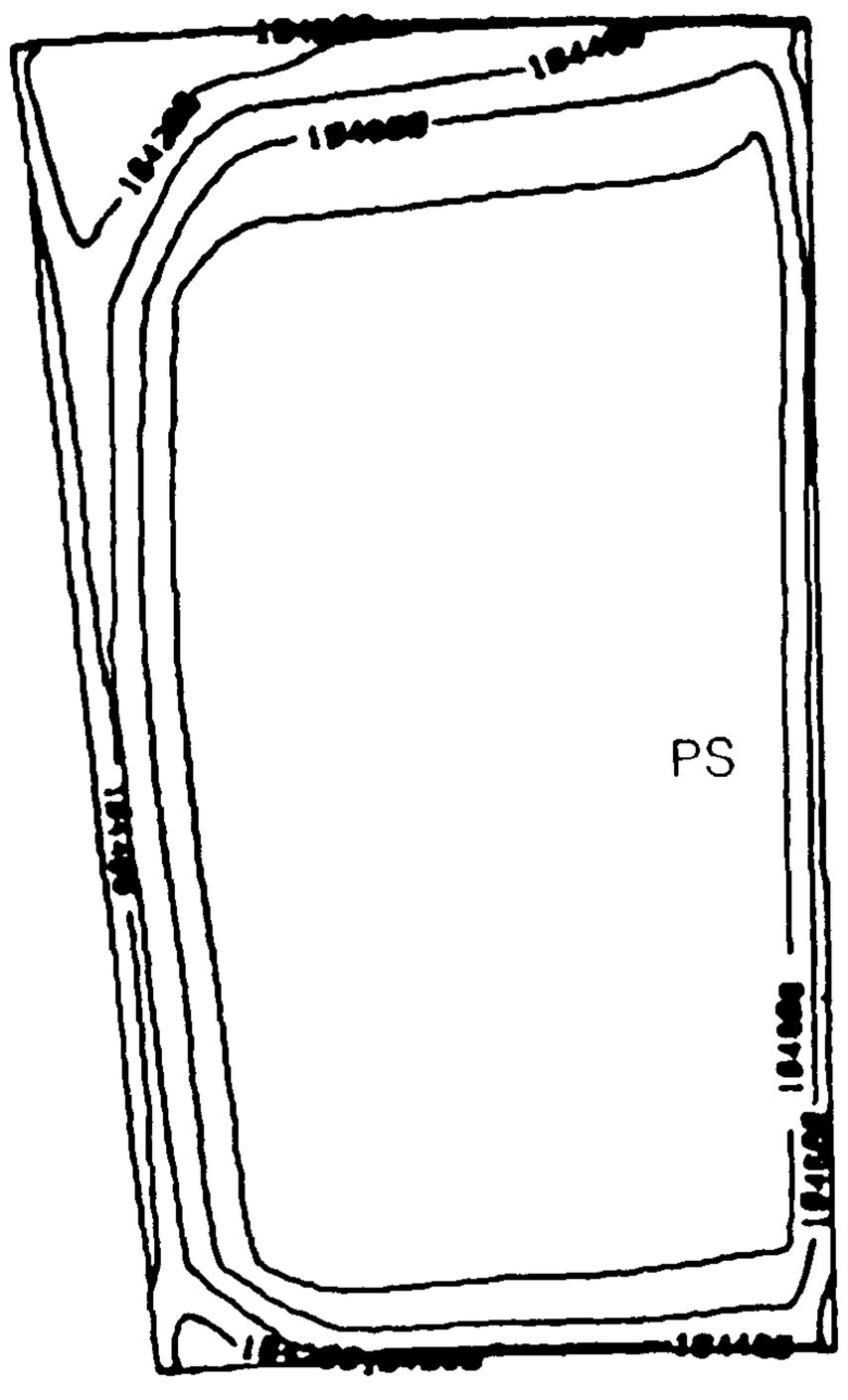
b) **MEFP calculation**

Fig 8.10

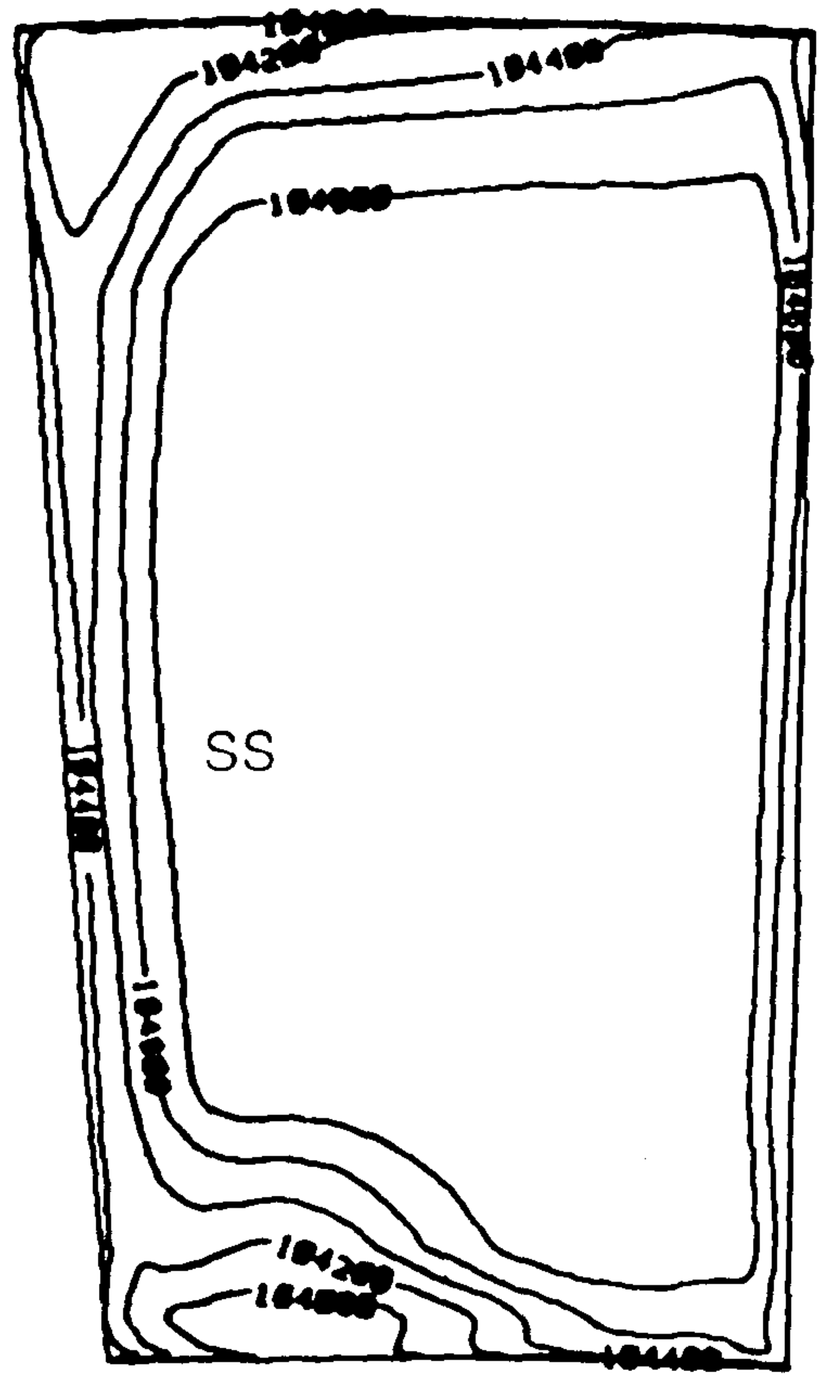
COARSE GRID MEFP RESULTS

Casing

Contours of Pa



No Gap



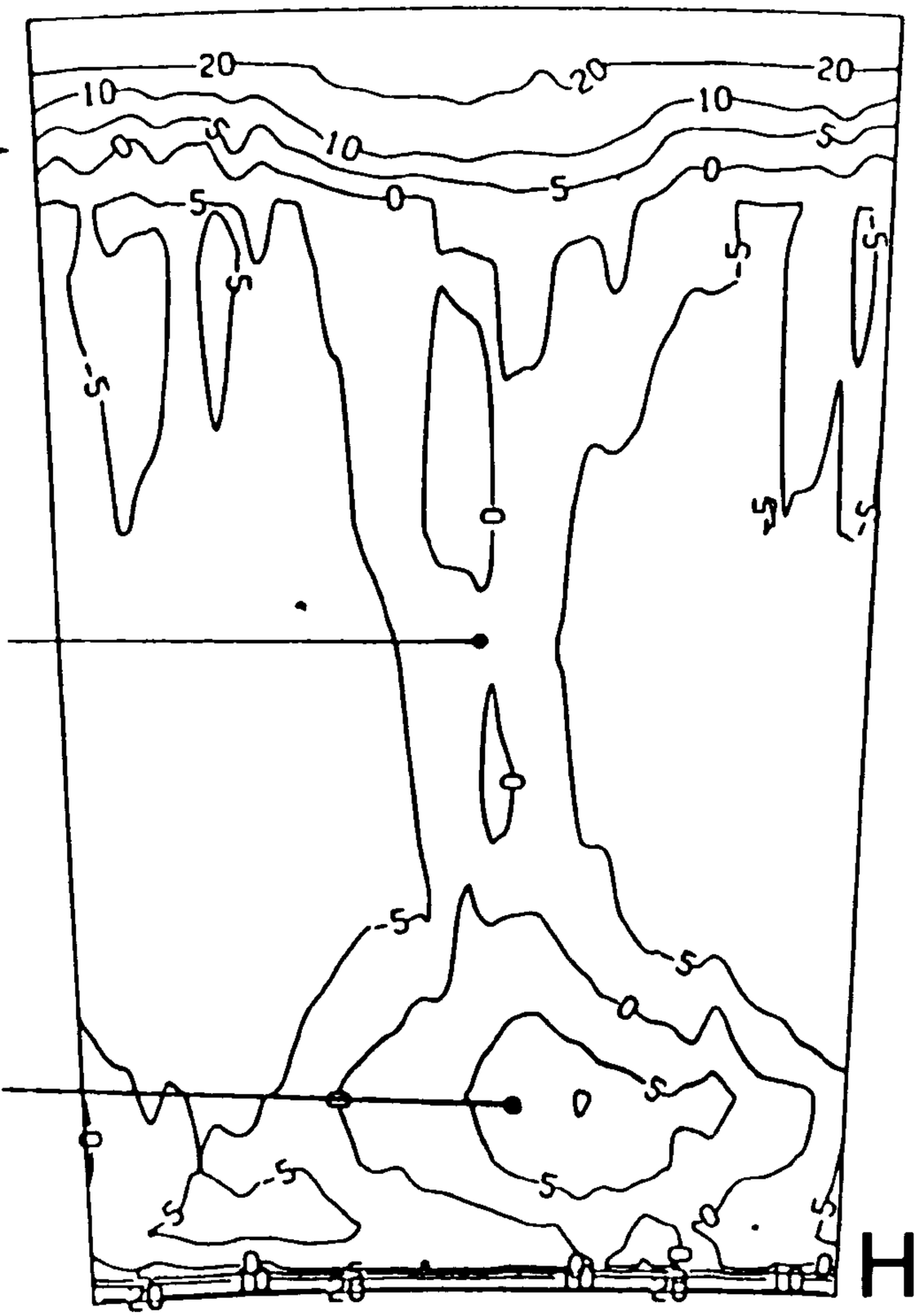
Gap, No Rotation

Hub

Fig 8.11

Conventional stator inlet total pressure contours $\left[\frac{\bar{P}_{01} - P_{02}}{\bar{P}_{01} - \bar{p}_1}\right]$

Smeared clearance flow from upstream rotor



Remains of upstream stator wake

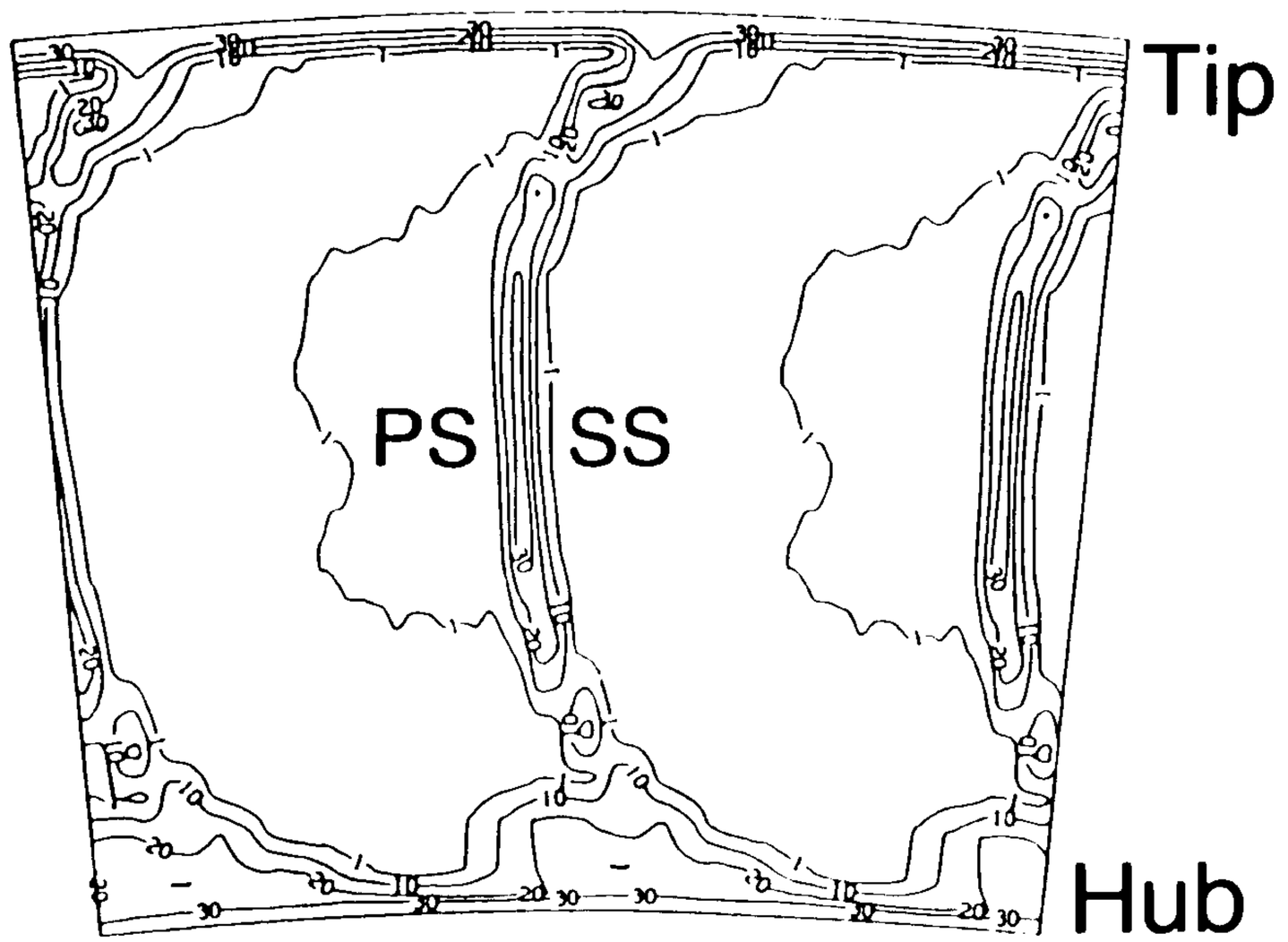
Remains of upstream stator clearance flow

U →

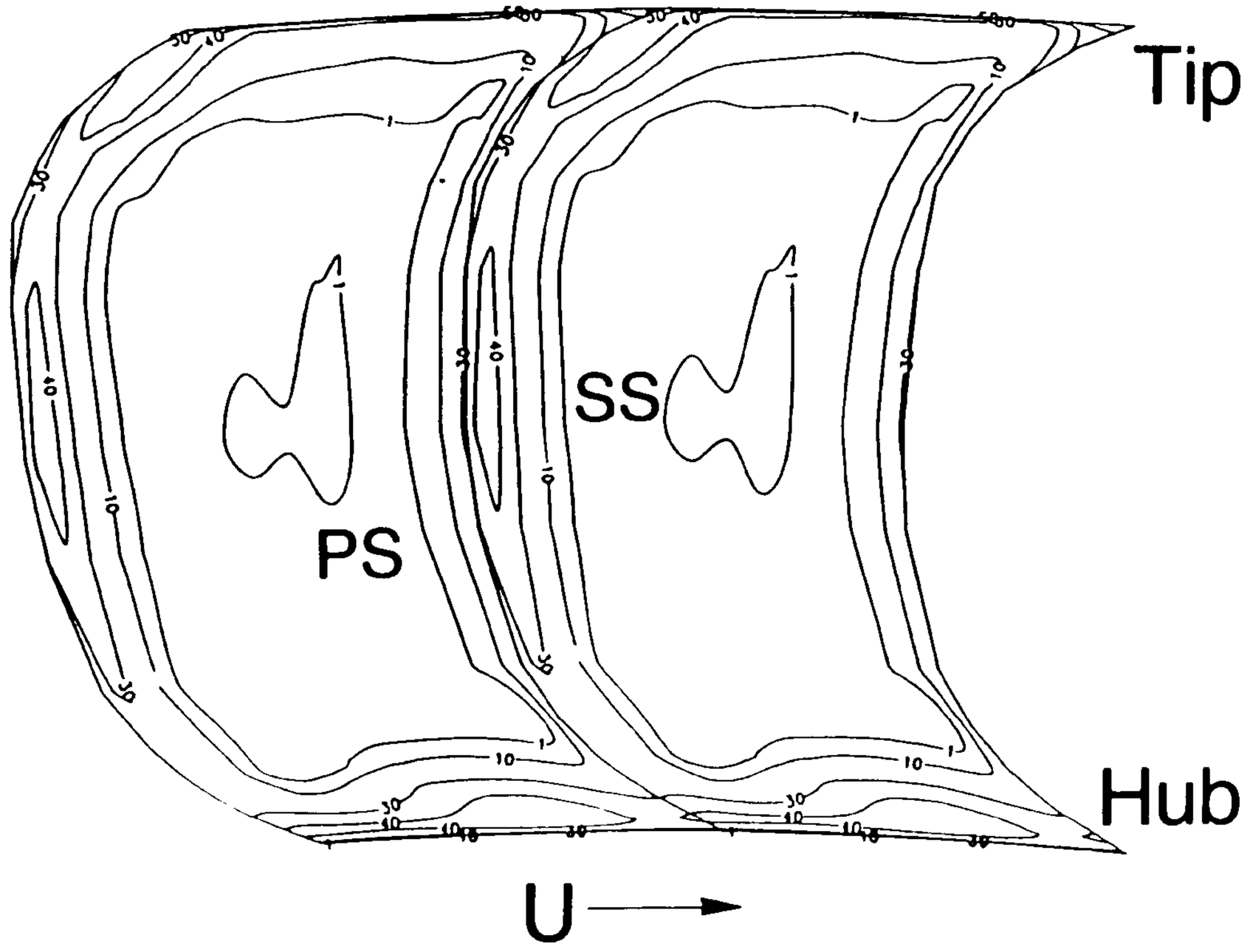
Test data

Fig 8.12

End-bend stator exit total pressure contours $\left[\frac{\bar{P}_{01} - P_{02}}{\bar{P}_{01} - \bar{p}_1}\right]$



a) **Test data**



b) **MEFP calculation**

Fig 8.13

MEFP CALCULATED LIFT DISTRIBUTIONS

Conventional Stator

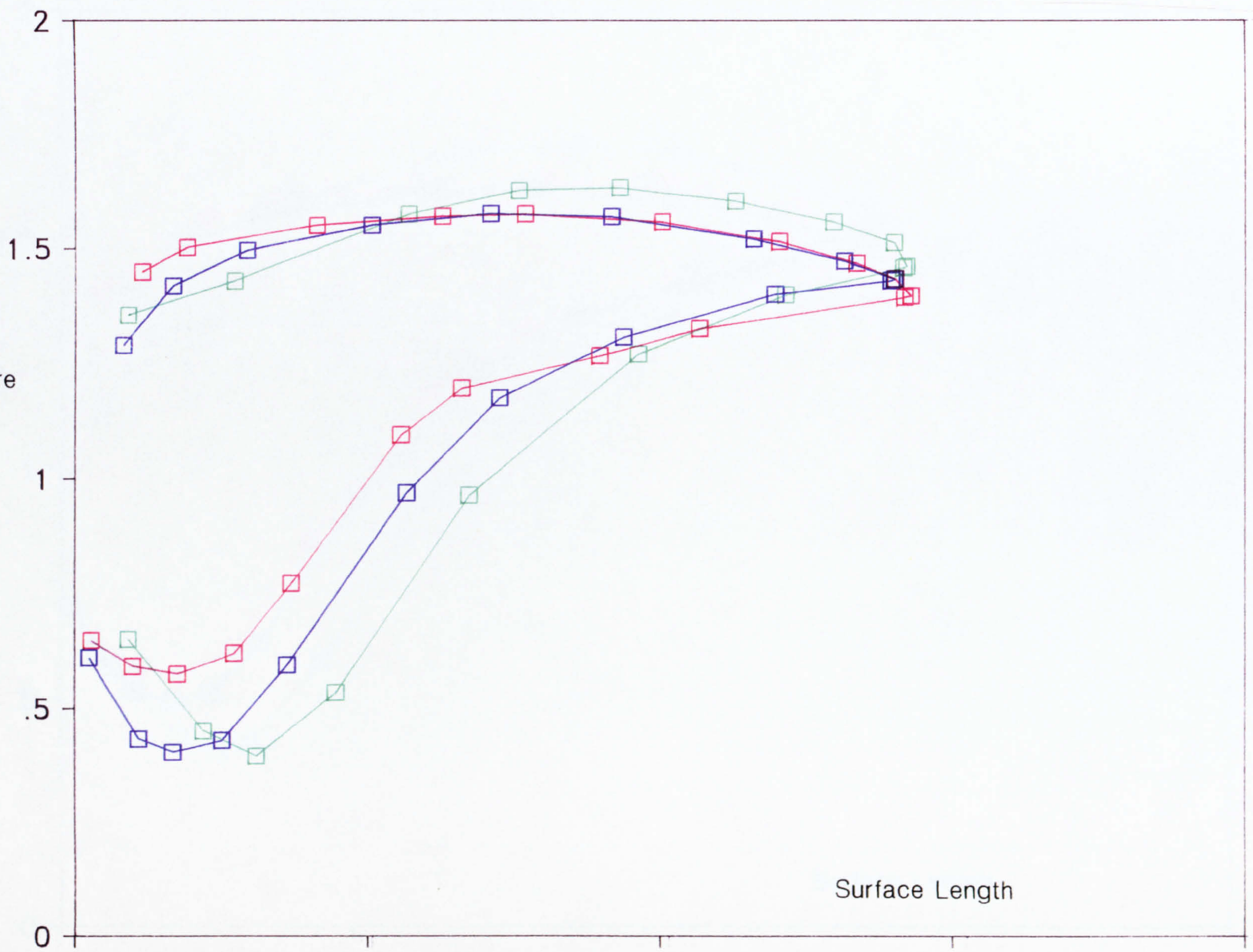


Fig 8.14

MEFP CALCULATED LIFT DISTRIBUTIONS

End-Bent Stator

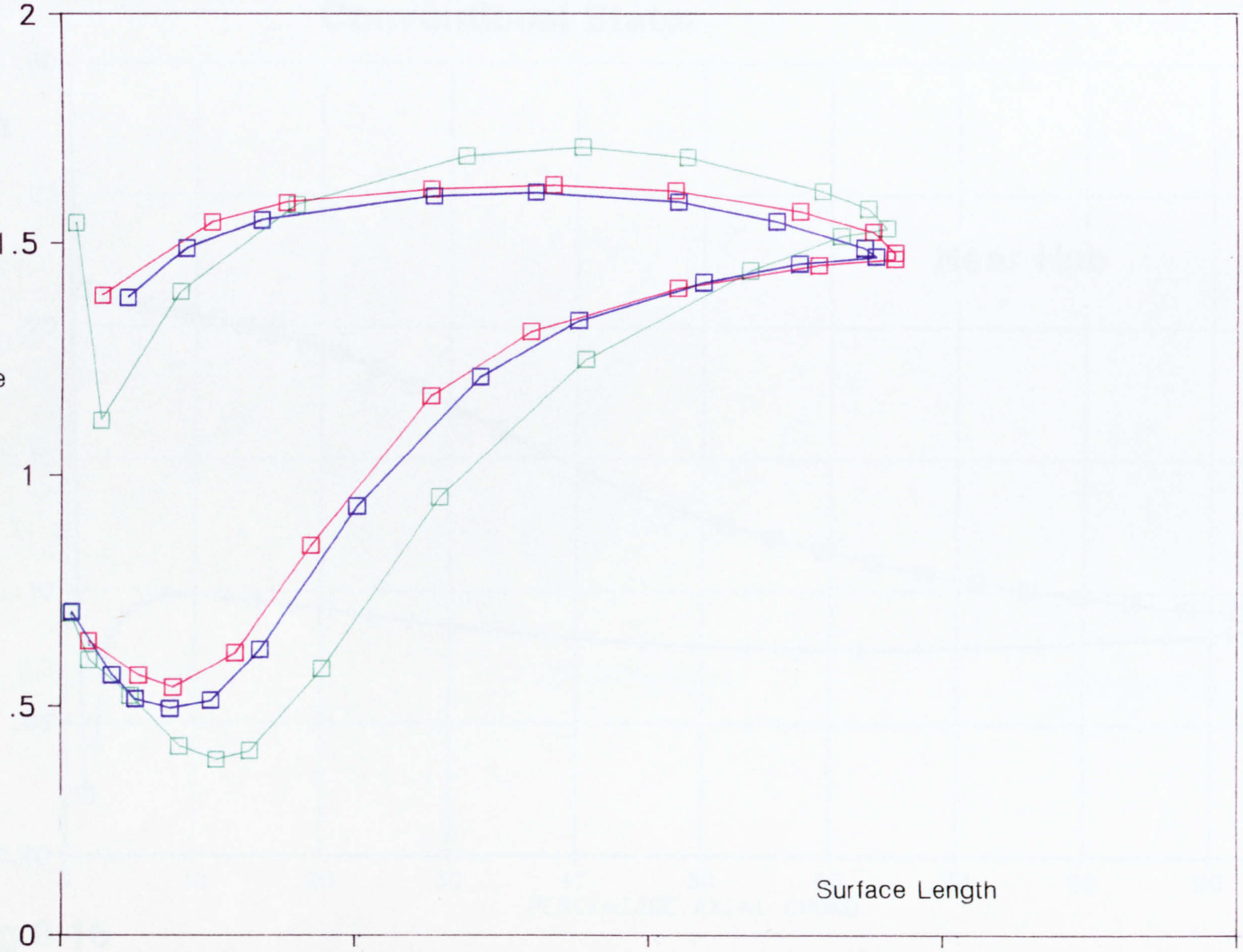


Fig 8.15

FINSUP 2D SURFACE MACH NUMBERS

Conventional Stator

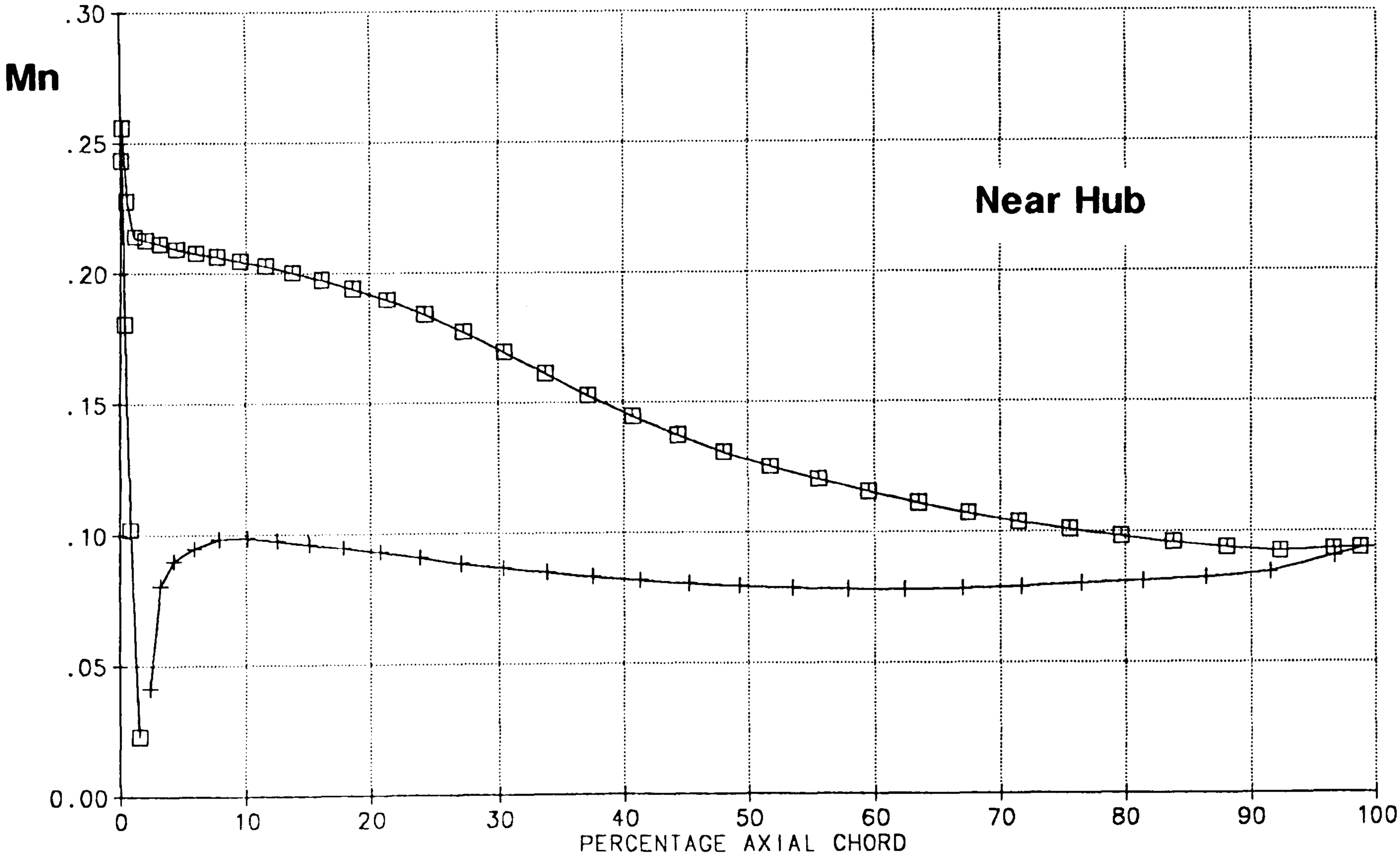
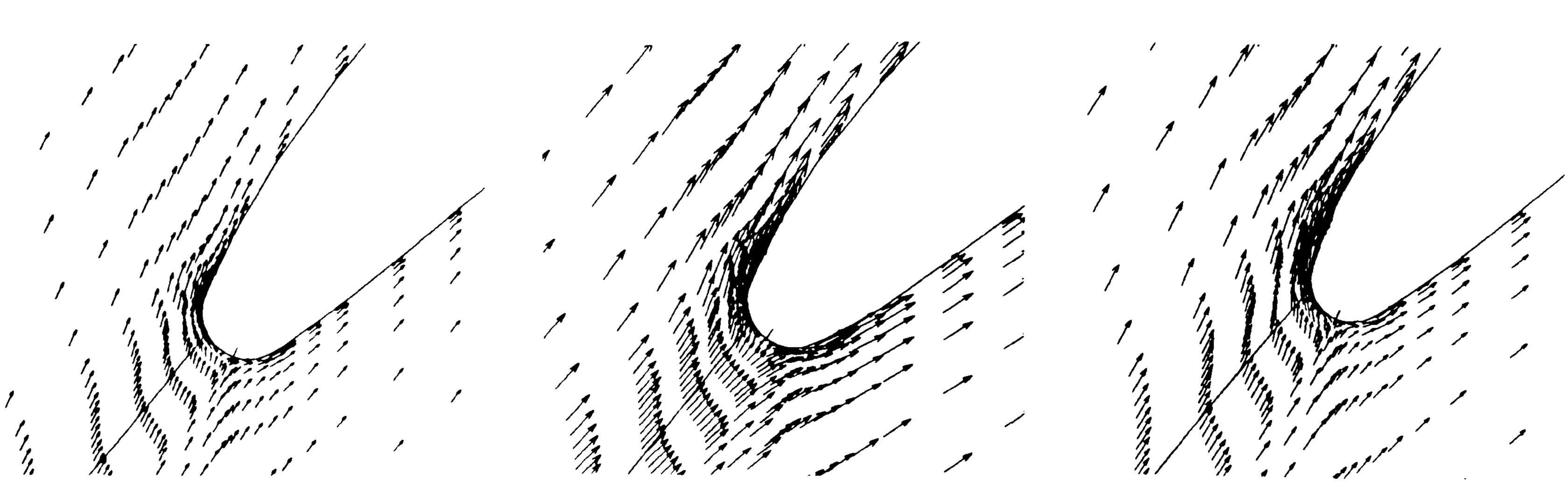


Fig 8.16

LOCATION OF STAGNATION POINTS

Conventional Stator

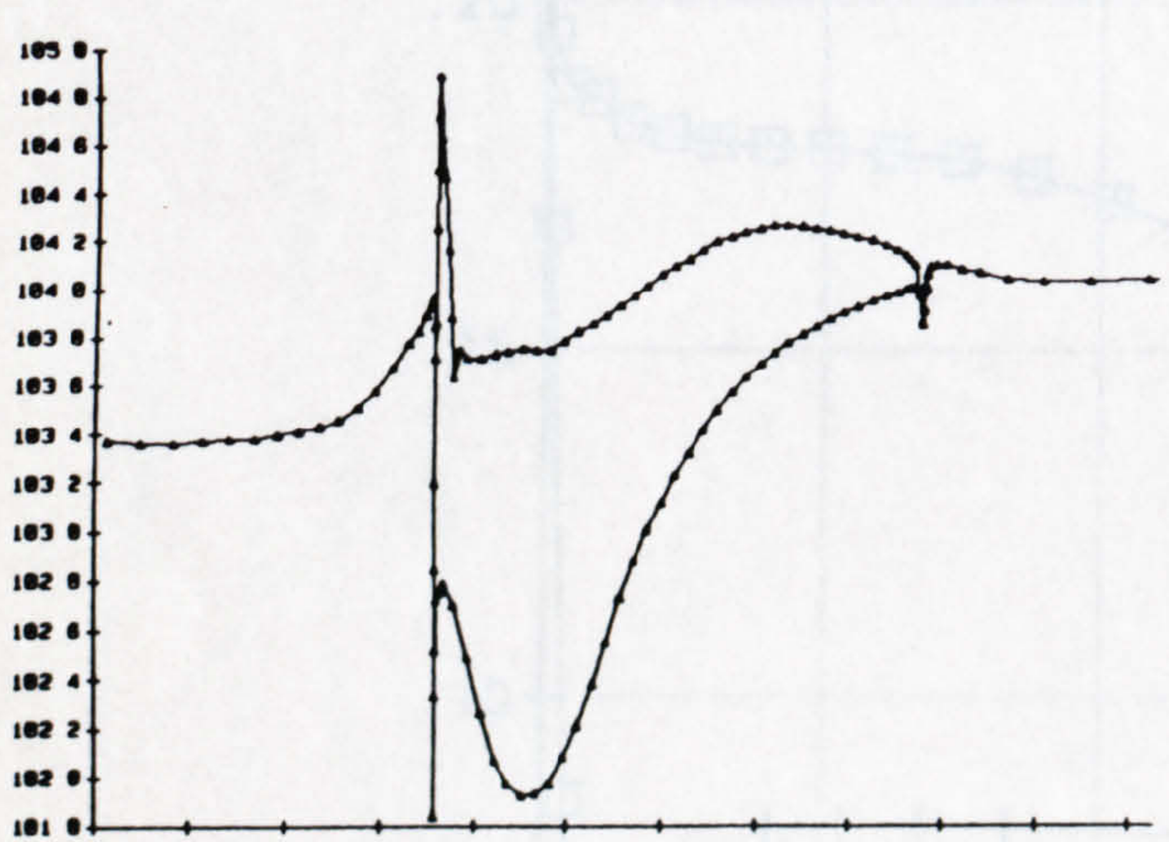


Near Hub | Mid-Height | Near Casing

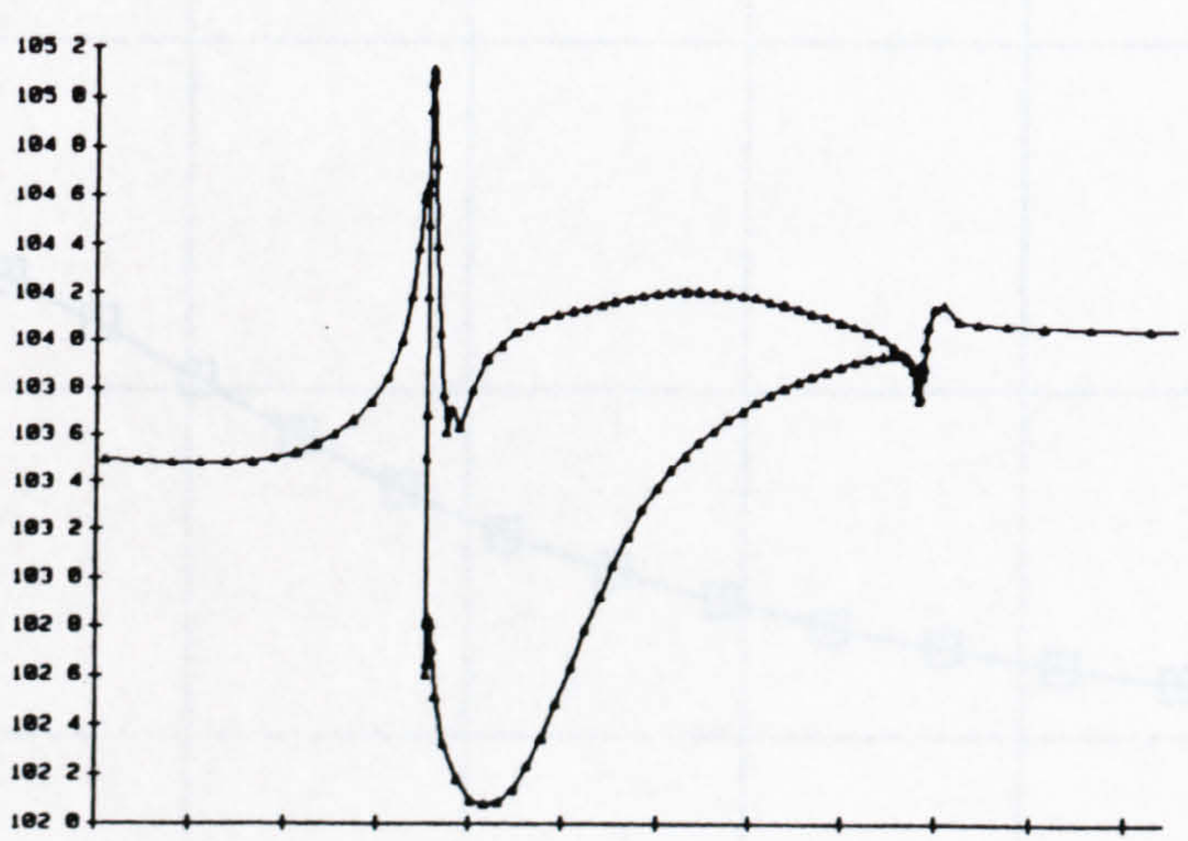
Fig 8.17

CORRESPONDING LIFT DISTRIBUTIONS

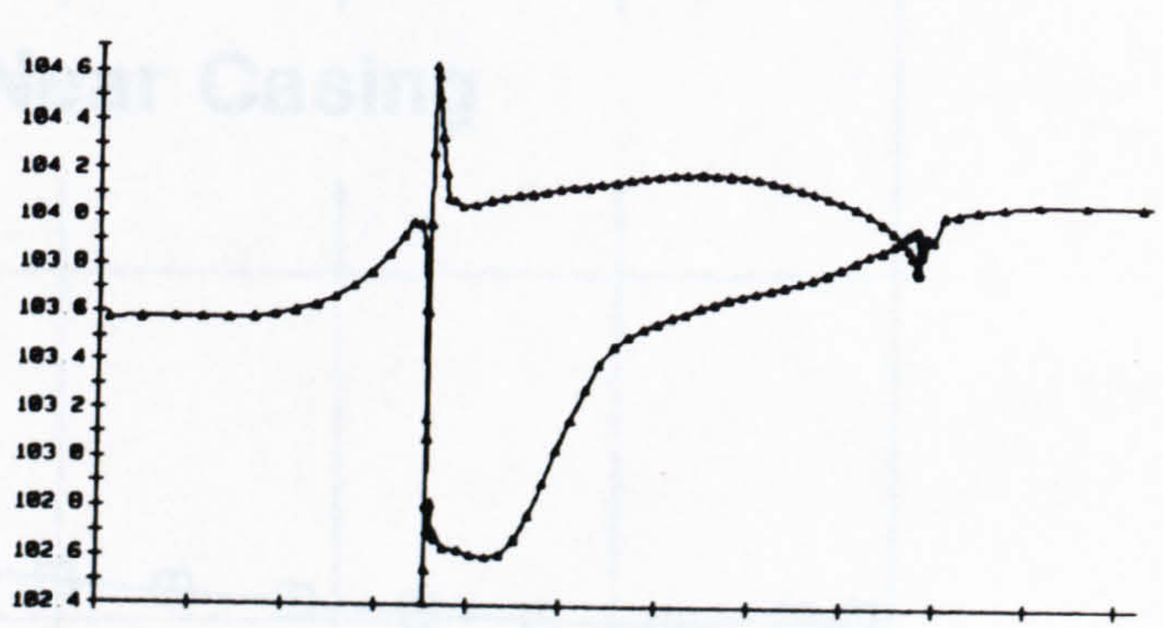
Conventional Stator



Near Hub



Mid-Height



Near Casing

Fig 8.18

FINSUP 2D SURFACE MACH NUMBERS

Conventional Stator

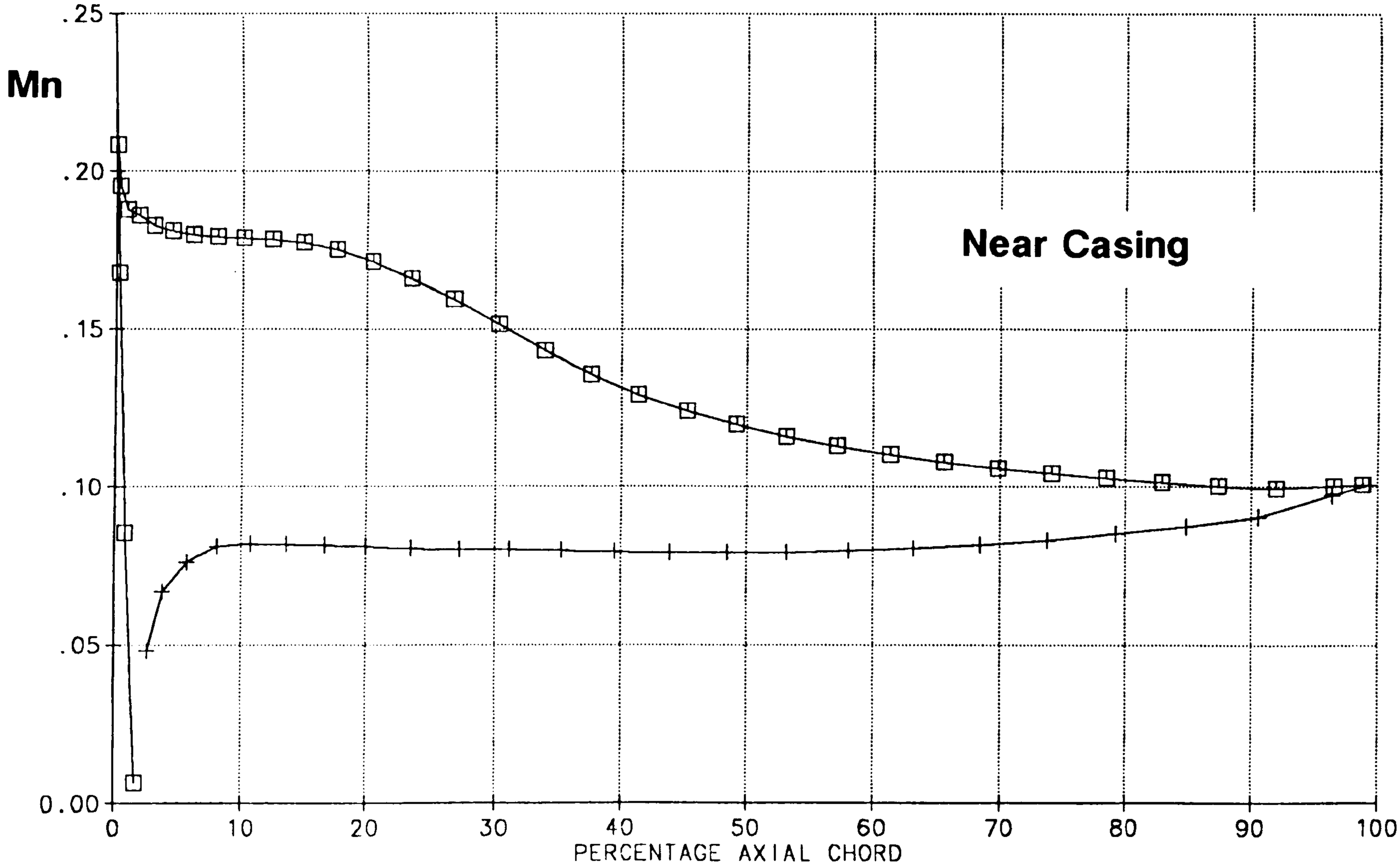
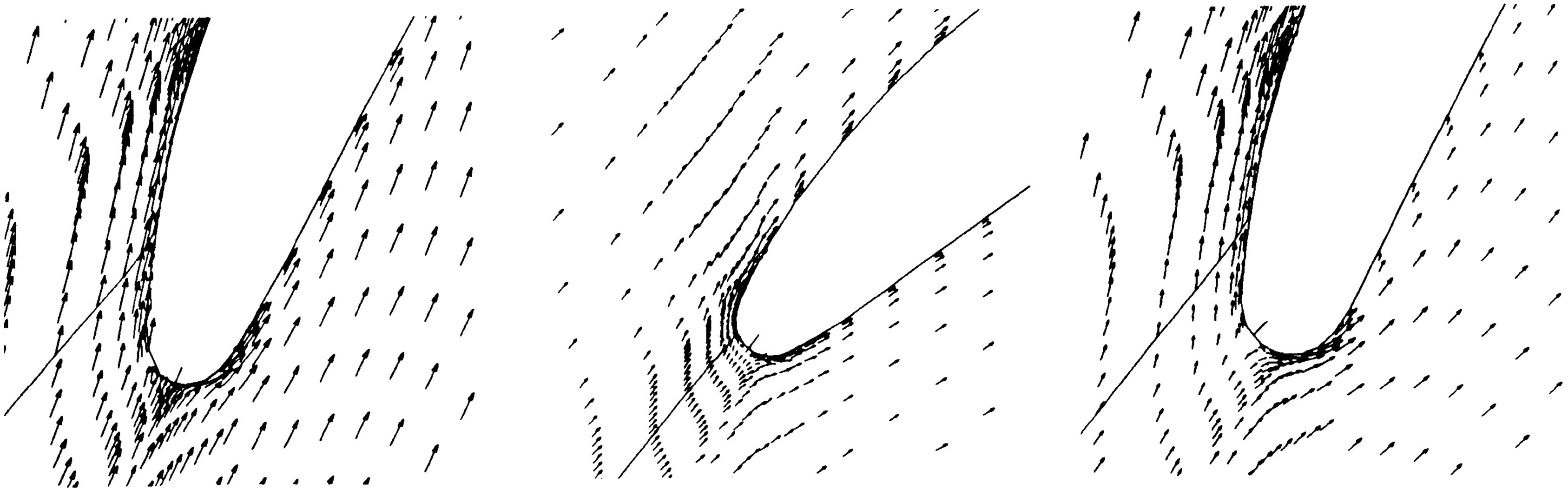


Fig 8.19

LOCATION OF STAGNATION POINTS

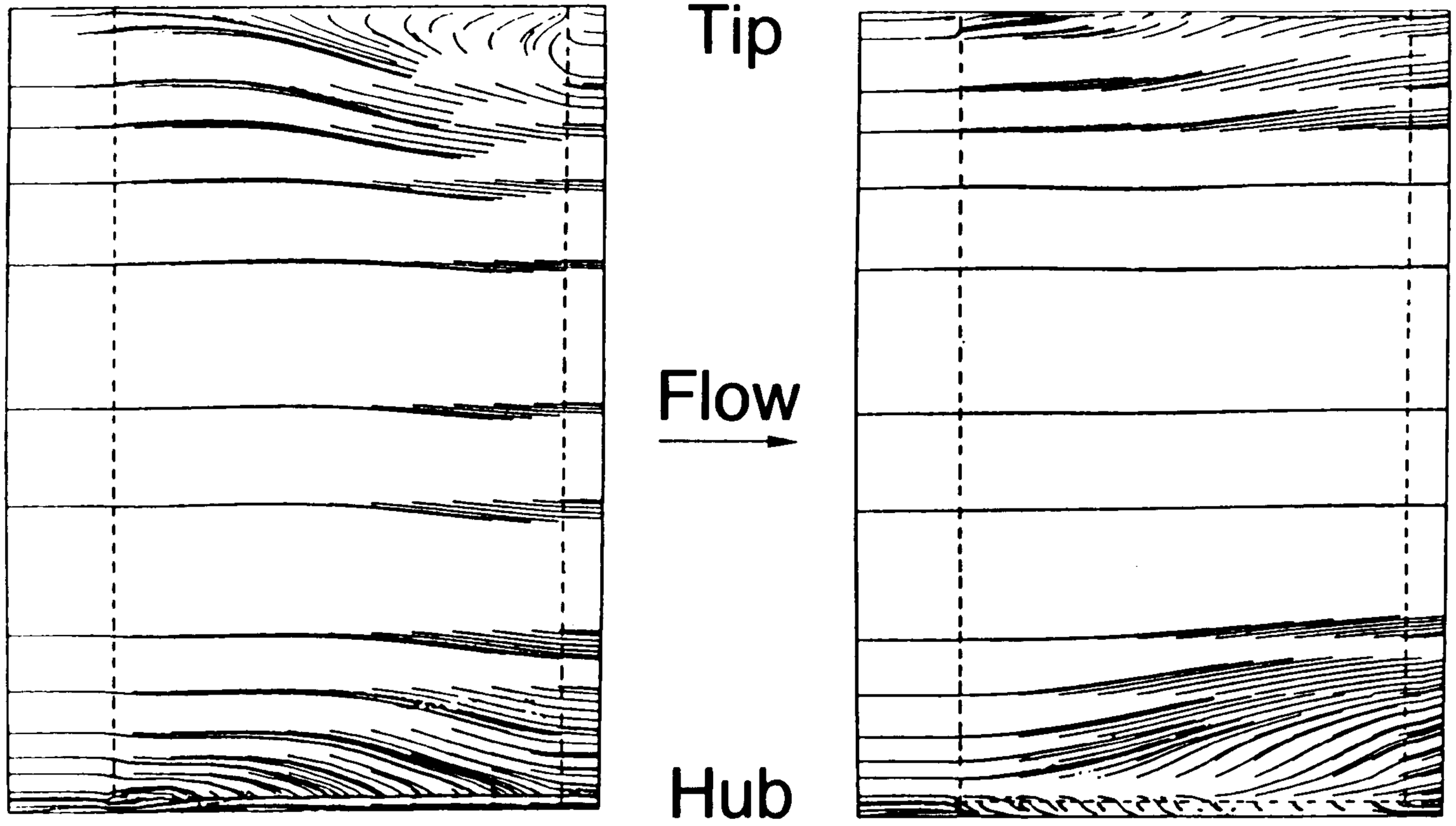
End-Bent Stator



Near Hub | Mid-Height | Near Casing

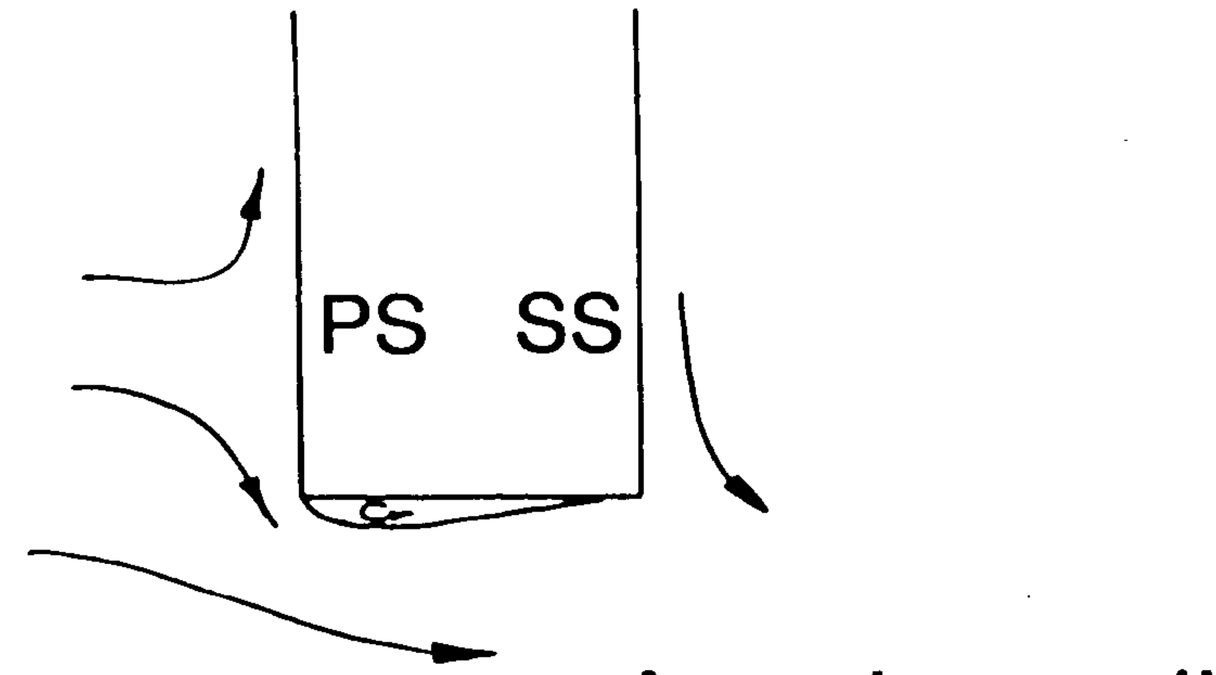
Fig 8.20

Conventional stator surface streaklines



a) **Suction surface** b) **Pressure surface**

Fig 8.21



Conventional stator : Detail of hub leakage flow

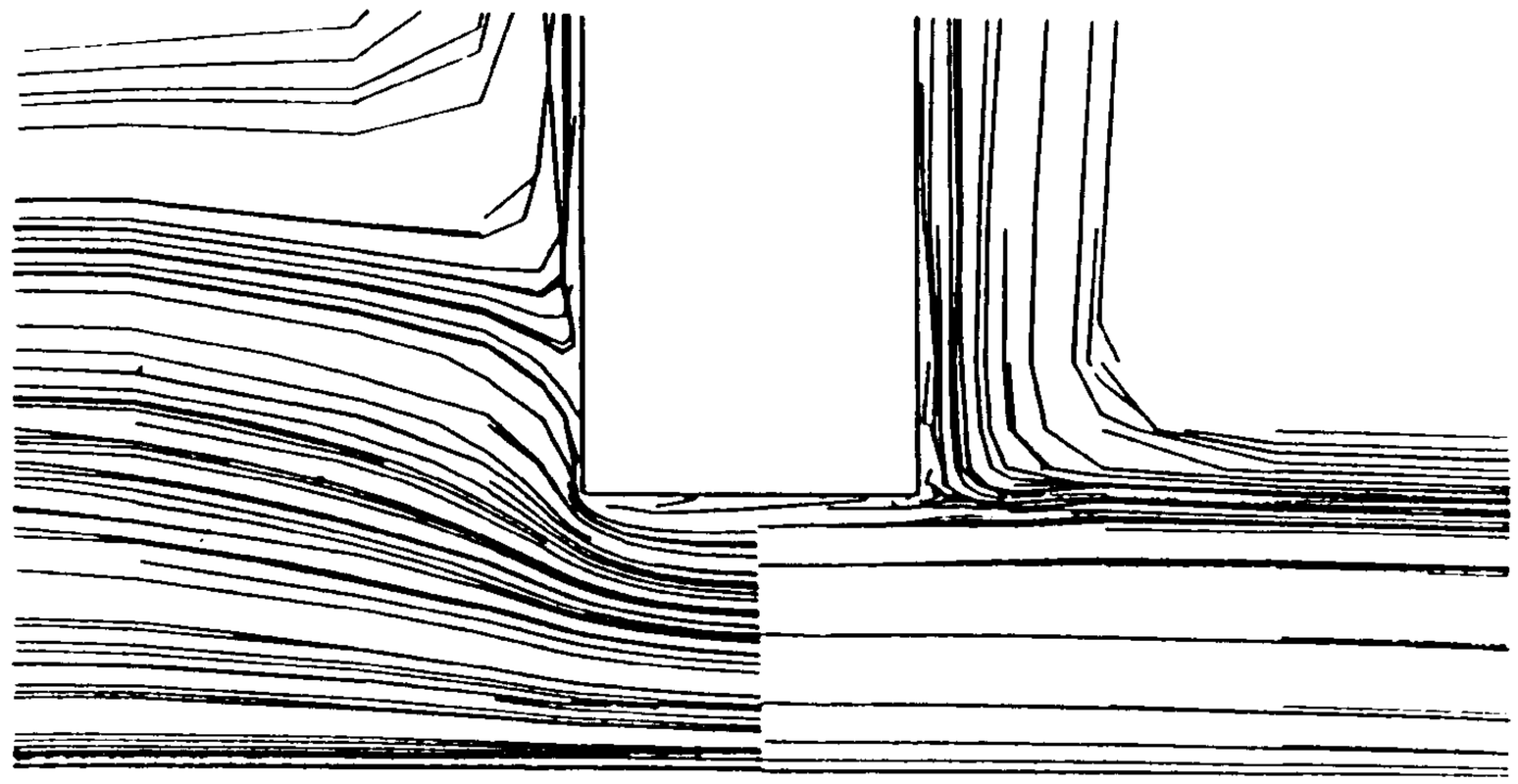
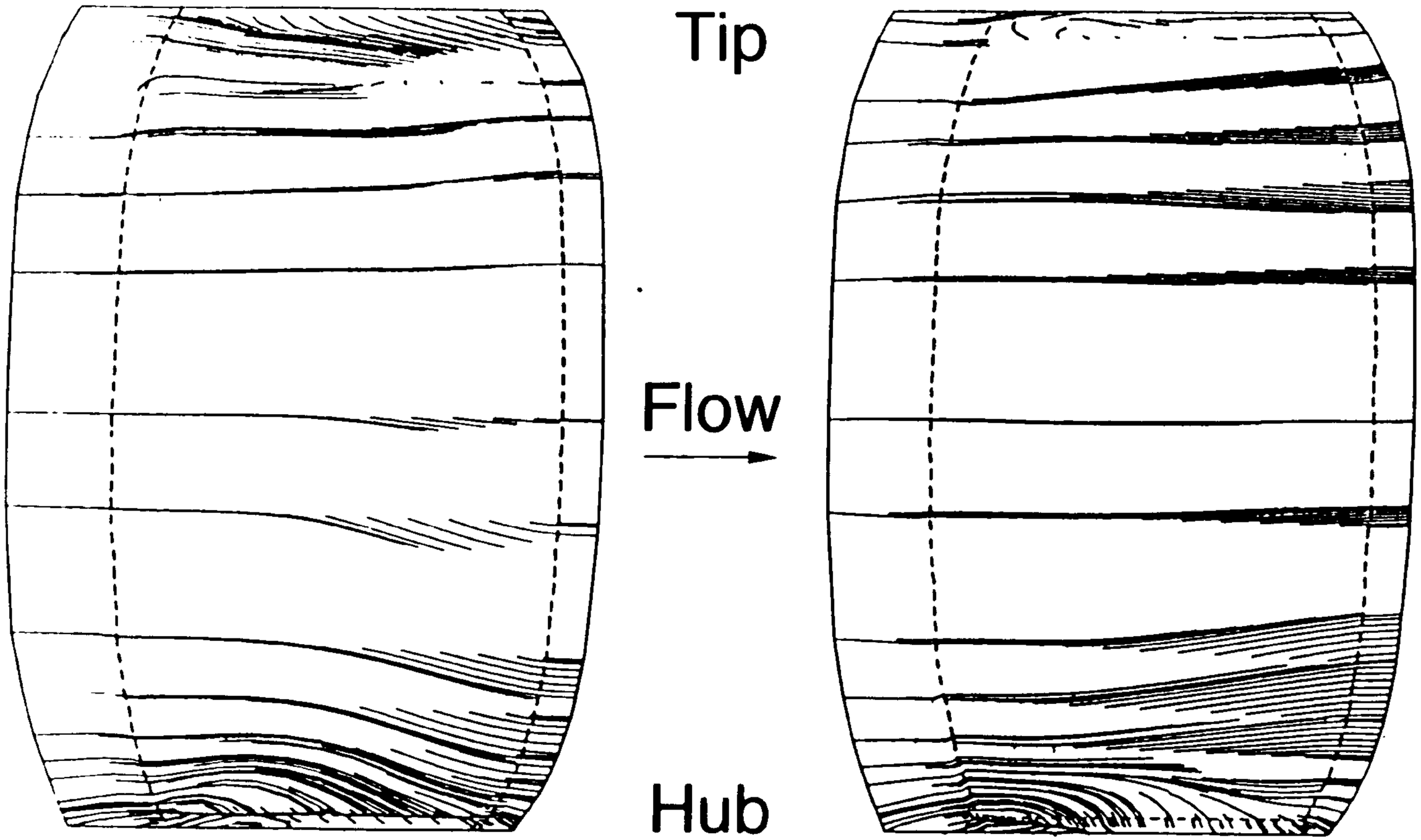


Fig 8.22

End-bent stator surface streaklines



a) **Suction surface** b) **Pressure surface**

Fig 8.23

APPENDIX 5.1

The starting point is to make an estimate of the boundary layer growth through the stage using, for example, Stratford (1967) or one of the modern semi-empircal methods such as Wright (1984). The boundary layer is assumed to have an axial velocity described by a simple power law profile

$$\frac{v_a}{V_a} = \left(\frac{y}{\delta}\right)^{1/n}$$

The extent of end-bend will be (n+1) times the displacement thickness, by definition. n is typically assumed to be 5.

Freeman (1978) suggested designing for constant tangential blade force through the boundary layers, so for a rotor

$$V_{a_3} V_{\theta_3} - V_{a_0} V_{\theta_0} = v_{a_3} v_{\theta_3} - v_{a_0} v_{\theta_0}$$

and for a stator

$$V_{a_3} V_{\theta_3} - V_{a_4} V_{\theta_4} = v_{a_3} v_{\theta_3} - v_{a_0} v_{\theta_0}$$

Lower case denotes values in the boundary layer, upper case denotes the values at the boundary layer edge. See fig 4.3 for the notation.

Consider the case of a compressor with an IGV with axial flow at inlet, so V_{θ_0} and v_{θ_0} are both zero.

Then

$$V_{a4} V_{\theta 4} = v_{a4} v_{\theta 4}$$

and thus

$$v_{\theta 4} = \frac{V_{a4} V_{\theta 4}}{v_{a4}}$$

The IGV exit angle is given by

$$\alpha_4' = \tan^{-1} \left(\frac{V_{a4} V_{\theta 4}}{v_{a4} v_{a4}} \right)$$

and the rotor inlet relative angle by

$$\alpha_1' = \tan^{-1} \left(\frac{U}{v_{a4}} - \tan \alpha_4' \right)$$

Across the rotor, from equation 1

$$V_{a3} V_{\theta 3} = v_{a3} v_{\theta 3}$$

Thus the rotor exit and stator inlet angles are given by

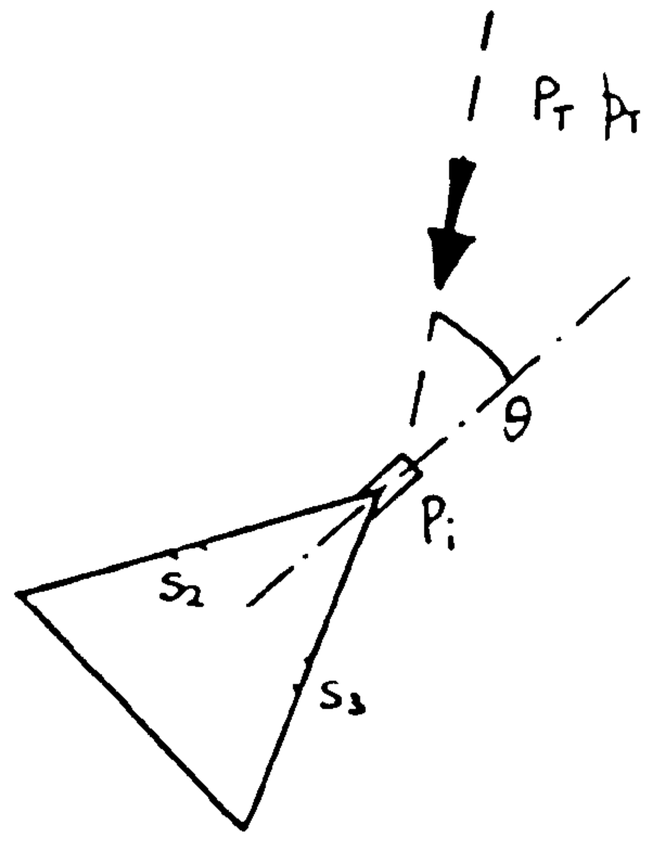
$$\alpha_3' = \tan^{-1} \left(\frac{V_{a3} V_{\theta 3}}{v_{a3} v_{a3}} \right)$$

$$\alpha_2' = \tan^{-1} \left(\frac{U}{v_{a3}} - \tan \alpha_3' \right)$$

The calculation for the stator is similar to that for the IGV. It may be seen that bladerows can be treated in isolation.

APPENDIX 6.1

PROBE CORRECTION ALGORITHM



Three non-dimensional coefficients are defined:

$$C_{yaw} = \frac{S_2 - S_3}{P_T - p_T}$$

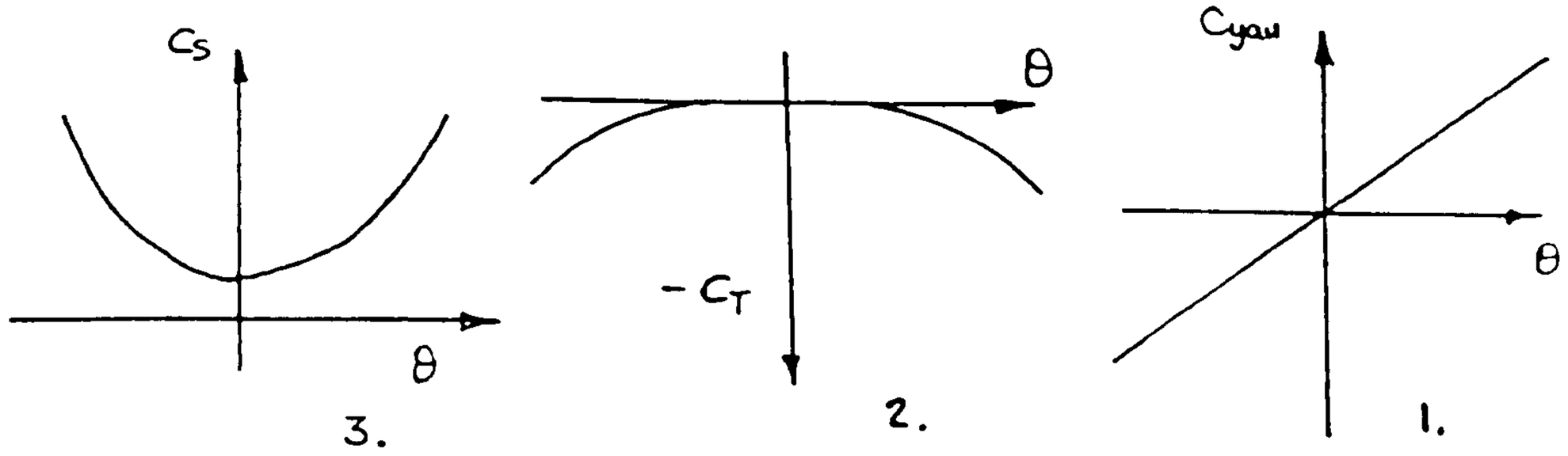
$$C_T = \frac{P_i - P_T}{P_T - p_T}$$

$$C_S = \frac{P_T/p_T - 1}{P_i/p_i - 1}$$

Where P_T and p_t are the true total and static pressures of the flow, P_i the indicated total pressure and S_2 and S_3 the side face pressures

P_i is defined as $(S_2 + S_3)/2$ and ds = S_2 - S_3

For each probe, a series of three curves are produced



The variables are weak functions of mach number and this is normally taken into account by producing a carpet of calibrations and interpolating also for mach number. However, in this case, the mach number is below 0.15 at all points in the flowfield, so a single curve is assumed unique.

During an area traverse, values of Pi, S_2 and S_3 are recorded at a nominal setting angle. The following routine estimates the true values of total and static pressure in the absense of the probe and the angle correction to the normal setting.

The procedure is as follows:-

Calculate P_i and ds

$D_1 = P_i - p_i$

Cyaw = ds/D_i

Look up θ from Cyaw curve 1

Look up C_s and C_T from curves 2 and 3

$$\phi_{T_{NEW}} = \frac{P_i}{\left[C_s(1+C_T)\left(P/p_i - 1\right) + 1\right]}$$

also $$P_{T_{NEW}} = \phi_{T_{NEW}}\left[C_s\left(P_i/p_i - 1\right) + 1\right]$$

then $D_{new} = P_{T_{NEW}} - \phi_{T_{NEW}}$

check $|D_{new} - D_{old}| \leq$ tolerance

Return to recalculate Cyaw

P_T, ϕ_T, θ

APPENDIX 7.

The following pages contain output from the throughflow analysis of traverse data at the peak efficiency and near stall operating points as follows :

7.1 DCA Datum
7.2 DCA with Inviscid End-Bends
7.3 Low-Reaction CD Datum
7.4 Low-Reaction CD with Inviscid End-Bends

The data is presented in imperial units scaled to a compressor inlet conditions of 14.7 psia and 288K. Other units are:

radius	inches
velocity	ft/s
pressure	psia
temperature	K

7.1 DCA Datum

AXIAL DIST	STREAM ABSOLUTE	RADIUS PERCENT	<--- VELOCITIES ----> MERID	REL WHIRL	REL TOTAL	MACH NUMBERS MERID	REL TOTAL	AIR REL WHIRL	ANGLES RADIAL	<-- TEMPERATURES ---> STATIC	TOTAL	RELATIVE	<---- PRESSURES ----> STATIC	TOTAL	RELATIVE	INC
0.000	20.400	0.000	63.9	143.0	156.6	0.057	0.140	65.91	0.00	289.8	290.0	290.9	14.93	14.97	15.14	3.71
0.000	20.475	2.071	75.0	145.6	163.7	0.067	0.146	62.74	0.08	289.7	290.0	291.0	14.93	14.98	15.16	0.44
0.000	20.577	4.912	88.5	151.6	175.5	0.079	0.157	59.74	0.20	289.6	290.0	291.1	14.93	15.00	15.19	-2.69
0.000	20.742	9.506	91.9	160.5	184.9	0.082	0.165	60.20	0.40	289.6	290.0	291.2	14.93	15.00	15.22	-2.42
0.000	20.913	14.257	90.9	164.1	187.6	0.081	0.168	61.03	0.55	289.6	290.0	291.2	14.93	15.00	15.23	-1.80
0.000	21.095	19.298	94.7	168.0	192.9	0.085	0.172	60.59	0.60	289.6	290.0	291.3	14.93	15.00	15.24	-2.46
0.000	21.462	29.496	103.4	170.0	199.0	0.092	0.178	58.69	0.54	289.5	290.0	291.3	14.93	15.02	15.26	-4.79
0.000	21.828	39.665	103.6	174.8	203.2	0.093	0.182	59.34	0.41	289.5	290.0	291.4	14.93	15.02	15.28	-4.56
0.000	22.192	49.785	103.1	178.3	205.9	0.092	0.184	59.96	0.29	289.5	290.0	291.5	14.93	15.02	15.29	-4.36
0.000	22.557	59.924	100.1	182.5	208.1	0.089	0.186	61.26	0.16	289.5	290.0	291.5	14.93	15.01	15.29	-3.47
0.000	22.924	70.123	98.1	184.6	209.0	0.088	0.187	62.00	0.04	289.6	290.0	291.6	14.93	15.01	15.30	-3.12
0.000	23.288	80.218	93.6	182.7	205.3	0.084	0.183	62.88	-0.04	289.6	290.0	291.5	14.93	15.00	15.28	-2.62
0.000	23.471	85.297	90.8	182.5	203.9	0.081	0.182	63.54	-0.06	289.6	290.0	291.5	14.93	15.00	15.28	-2.15
0.000	23.656	90.451	88.3	183.9	204.0	0.079	0.182	64.35	-0.14	289.6	290.0	291.6	14.93	15.00	15.28	-1.53
0.000	23.855	95.980	78.5	188.9	204.6	0.070	0.183	67.45	-0.14	289.7	290.0	291.7	14.93	14.98	15.28	1.37
0.000	23.938	98.290	74.0	191.8	205.5	0.066	0.184	68.89	-0.05	289.7	290.0	291.7	14.93	14.98	15.29	2.73
0.000	24.000	100.000	70.6	193.4	205.9	0.063	0.184	69.95	0.00	289.8	290.0	291.7	14.93	14.97	15.29	3.72

ACROSS THE ROTOR

PRES LOSS COEFF	SPACE CHORD RATIO	DIFFUSION FACTOR	STATIC PRES RISE COEFFS INCOMP	COMP	DE HALLER NUMBER	MERID VELOCITY RATIO	WORK FUNCTIONS DH/U2*U2	FLOW VAM/U	ROTOR PRES RATIO	ROTOR TEMP RATIO	BLADE EFF	STREAM HEIGHT RATIO	LIFT COEFF
-0.0045	0.9111	0.5917	0.6110	0.6143	0.6237	1.0827	0.4618	0.3987	1.0134	0.0038	100.46	0.918	0.6191
0.0257	0.9142	0.5594	0.5906	0.5635	0.6398	0.9869	0.4437	0.4661	1.0125	0.0037	97.01	1.007	0.6196
0.0752	0.9188	0.5236	0.5677	0.4918	0.6575	0.9131	0.4279	0.5471	1.0113	0.0036	89.71	1.089	0.6020
0.0817	0.9266	0.4782	0.5278	0.4465	0.6872	0.9225	0.4042	0.5636	1.0105	0.0034	87.11	1.077	0.5615
0.0545	0.9344	0.4449	0.4914	0.4376	0.7132	0.9667	0.3853	0.5528	1.0106	0.0033	90.88	1.027	0.5338
0.0357	0.9423	0.4154	0.4531	0.4178	0.7395	1.0209	0.3817	0.5712	1.0110	0.0034	93.74	0.972	0.5169
0.0336	0.9575	0.3954	0.4324	0.3985	0.7534	1.0023	0.3663	0.6133	1.0110	0.0033	93.69	0.991	0.5079
0.0317	0.9723	0.3844	0.4196	0.3872	0.7618	1.0126	0.3558	0.6039	1.0110	0.0033	93.82	0.981	0.4993
0.0465	0.9880	0.3913	0.4278	0.3803	0.7565	1.0008	0.3531	0.5911	1.0109	0.0034	90.92	0.993	0.5065
0.0360	1.0036	0.3769	0.4124	0.3749	0.7666	1.0152	0.3356	0.5645	1.0110	0.0034	92.68	0.979	0.4916
0.0361	1.0184	0.3746	0.4109	0.3730	0.7675	1.0093	0.3237	0.5446	1.0109	0.0034	92.58	0.985	0.4890
0.0382	1.0336	0.3918	0.4279	0.3876	0.7564	1.0018	0.3218	0.5113	1.0112	0.0034	92.60	0.992	0.5081
0.0253	1.0415	0.3870	0.4211	0.3933	0.7609	1.0184	0.3141	0.4924	1.0114	0.0034	95.13	0.976	0.5039
0.0278	1.0493	0.3900	0.4230	0.3924	0.7596	1.0284	0.3134	0.4751	1.0115	0.0035	94.71	0.967	0.5066
0.0915	1.0579	0.4423	0.4839	0.3902	0.7184	0.9508	0.3318	0.4185	1.0109	0.0037	83.72	1.046	0.5519
0.1331	1.0618	0.4765	0.5212	0.3868	0.6920	0.8801	0.3469	0.3935	1.0106	0.0039	77.30	1.130	0.5924
0.1498	1.0650	0.4889	0.5362	0.3859	0.6810	0.8207	0.3484	0.3743	1.0104	0.0040	74.62	1.212	0.6162

AXIAL DIST	MESH RADIUS ABSOLUTE	PERCENT	BLADE SPEED	VELOCITIES MERID	WHIRL	TOTAL	REL WHIRL	REL TOTAL	MACH NUMBERS TOTAL	REL TOTAL	AIR ANGLES RADIAL	WHIRL	REL WHIRL	REL AXIAL WHIRL	1/RAD CURV
1.400	20.400	0.000	160.33	69.2	91.4	114.6	68.9	97.7	0.102	0.087	0.00	52.87	44.89	44.89	0.000
1.400	20.472	2.000	160.89	74.0	86.8	114.0	74.1	104.8	0.102	0.093	0.03	49.53	45.04	45.04	0.039
1.400	20.580	5.000	161.74	80.8	79.3	113.2	82.4	115.4	0.101	0.103	0.13	44.47	45.58	45.58	-0.000
1.400	20.760	10.000	163.16	84.8	68.5	109.0	94.7	127.1	0.097	0.113	0.32	38.94	48.15	48.15	-0.121
1.400	20.940	15.000	164.57	87.8	63.7	108.5	100.9	133.8	0.097	0.119	0.46	35.93	48.96	48.97	-0.191
1.400	21.120	20.000	165.99	96.7	61.1	114.4	104.9	142.6	0.102	0.127	0.47	32.30	47.32	47.32	-0.168
1.400	21.480	30.000	168.82	103.7	60.5	120.0	108.3	150.0	0.107	0.134	0.40	30.25	46.26	46.26	-0.102
1.400	21.840	40.000	171.65	104.9	57.8	119.8	113.8	154.8	0.107	0.138	0.30	28.87	47.33	47.33	-0.059
1.400	22.200	50.000	174.47	103.2	57.7	118.2	116.7	155.8	0.105	0.139	0.20	29.24	48.53	48.53	-0.035
1.400	22.560	60.000	177.30	101.6	54.3	115.2	123.0	159.5	0.103	0.142	0.09	28.13	50.44	50.44	-0.008
1.400	22.920	70.000	180.13	99.0	53.9	112.8	126.2	160.4	0.101	0.143	-0.04	28.57	51.88	51.88	0.043
1.400	23.280	80.000	182.96	93.8	59.2	110.9	123.8	155.3	0.099	0.139	-0.12	32.27	52.86	52.86	0.061
1.400	23.460	85.000	184.38	92.5	59.9	110.2	124.5	155.1	0.098	0.138	-0.16	32.91	53.39	53.39	0.084
1.400	23.640	90.000	185.79	90.8	60.2	109.0	125.6	155.0	0.097	0.138	-0.21	33.54	54.12	54.12	0.137
1.400	23.838	95.500	187.35	74.6	60.7	96.2	126.6	147.0	0.086	0.131	-0.19	39.14	59.50	59.50	0.154
1.400	23.928	98.000	188.06	65.2	61.6	89.7	126.4	142.2	0.080	0.127	-0.11	43.41	62.74	62.74	0.094
1.400	24.000	100.000	188.62	57.9	60.9	84.1	127.7	140.2	0.075	0.125	0.00	46.44	65.59	65.59	0.000

PRESSURES STATIC	TOTAL	RELATIVE	TEMPERATURES STATIC	TOTAL	RELATIVE	MASS FLOW	DEV
15.06	15.17	15.14	290.5	291.1	290.9	0.00	16.96
15.06	15.17	15.15	290.5	291.1	291.0	0.36	16.50
15.06	15.17	15.17	290.4	291.0	291.1	0.94	16.10
15.06	15.16	15.19	290.4	291.0	291.2	1.99	17.11
15.06	15.16	15.21	290.4	291.0	291.2	3.09	16.41
15.06	15.17	15.23	290.4	291.0	291.3	4.27	13.31
15.06	15.18	15.25	290.3	291.0	291.3	6.90	9.48
15.06	15.18	15.27	290.3	291.0	291.4	9.67	8.00
15.06	15.18	15.27	290.3	291.0	291.5	12.47	6.94
15.07	15.18	15.28	290.4	291.0	291.5	15.27	6.97
15.07	15.17	15.28	290.4	291.0	291.6	18.06	6.67
15.07	15.17	15.27	290.4	291.0	291.5	20.78	6.40
15.07	15.17	15.27	290.4	291.0	291.5	22.11	6.59
15.07	15.17	15.27	290.5	291.0	291.6	23.43	7.48
15.07	15.15	15.25	290.6	291.1	291.6	24.77	13.50
15.07	15.14	15.24	290.8	291.1	291.7	25.28	17.03
15.07	15.13	15.23	290.8	291.1	291.7	25.64	20.07

AXIAL DIST	STREAM RADIUS ABSOLUTE	STREAM RADIUS PERCENT	VELOCITIES MERID	VELOCITIES WHIRL	VELOCITIES TOTAL	MACH NUMBERS MERID	MACH NUMBERS TOTAL	AIR ANGLES WHIRL	AIR ANGLES RADIAL	TEMPERATURES STATIC	TEMPERATURES TOTAL	PRESSURES STATIC	PRESSURES TOTAL	INC
2.000	20.400	0.000	68.7	91.4	114.3	0.061	0.102	53.06	-0.00	290.5	291.1	15.06	15.17	13.60
2.000	20.468	1.896	73.3	87.0	113.8	0.065	0.101	49.90	0.04	290.5	291.1	15.06	15.17	10.63
2.000	20.579	4.980	80.3	79.4	112.9	0.072	0.101	44.69	0.07	290.4	291.0	15.06	15.17	5.74
2.000	20.768	10.234	84.5	68.2	108.6	0.075	0.097	38.92	0.10	290.4	291.0	15.06	15.16	0.50
2.000	20.953	15.367	87.9	63.4	108.4	0.078	0.097	35.81	0.12	290.4	291.0	15.06	15.16	-2.10
2.000	21.132	20.341	96.9	61.1	114.5	0.086	0.102	32.23	0.14	290.4	291.0	15.06	15.17	-5.22
2.000	21.487	30.201	103.8	60.4	120.1	0.093	0.107	30.21	0.16	290.3	291.0	15.06	15.18	-6.40
2.000	21.843	40.083	105.1	57.8	120.0	0.094	0.107	28.83	0.15	290.3	291.0	15.06	15.18	-7.07
2.000	22.202	50.057	103.4	57.7	118.4	0.092	0.106	29.19	0.11	290.3	291.0	15.06	15.18	-6.17
2.000	22.561	60.017	101.8	54.3	115.4	0.091	0.103	28.07	0.06	290.4	291.0	15.07	15.18	-7.14
2.000	22.917	69.906	99.2	53.9	112.9	0.089	0.101	28.52	0.03	290.4	291.0	15.07	15.17	-6.76
2.000	23.272	79.783	93.9	59.1	111.0	0.084	0.099	32.19	0.03	290.4	291.0	15.07	15.17	-3.24
2.000	23.447	84.636	92.6	59.8	110.3	0.083	0.098	32.86	0.04	290.4	291.0	15.07	15.17	-2.66
2.000	23.620	89.457	91.3	60.2	109.3	0.081	0.098	33.39	0.07	290.4	291.0	15.07	15.17	-2.23
2.000	23.818	94.957	76.3	60.6	97.5	0.068	0.087	38.46	0.07	290.6	291.1	15.07	15.15	2.72
2.000	23.915	97.646	66.3	61.6	90.5	0.059	0.081	42.89	0.05	290.8	291.1	15.07	15.14	7.08
2.000	24.000	100.000	57.7	60.9	83.9	0.051	0.075	46.54	0.00	290.8	291.1	15.07	15.13	10.67

ACROSS THE STATOR

PRES LOSS COEFF	SPACE CHORD RATIO	DIFFUSION FACTOR	STATIC PRES RISE COEFFS INCOMP	STATIC PRES RISE COEFFS COMP	DE HALLER NUMBER	MERID VELOCITY RATIO	STAGE PRES RATIO	STAGE TEMP RATIO	EFFICIENCIES STAGE	EFFICIENCIES ACCUM	STREAM HEIGHT RATIO	LIFT COEFF
0.4077	0.8818	0.7383	0.6874	0.2801	0.5591	0.907	1.0104	0.0038	78.04	78.04	1.102	0.8522
0.3079	0.8847	0.6455	0.5865	0.2789	0.6431	0.983	1.0103	0.0037	79.97	79.97	1.016	0.8585
0.1539	0.8892	0.5244	0.4312	0.2773	0.7542	1.055	1.0102	0.0036	81.03	81.03	0.946	0.8761
0.0553	0.8966	0.4657	0.3467	0.2911	0.8083	1.039	1.0101	0.0034	84.22	84.22	0.962	0.9075
0.0467	0.9041	0.4412	0.3266	0.2796	0.8206	1.012	1.0103	0.0033	88.18	88.18	0.988	0.8933
0.0635	0.9115	0.4144	0.3075	0.2438	0.8321	0.984	1.0106	0.0034	89.87	89.87	1.016	0.8670
0.0621	0.9263	0.3807	0.2696	0.2072	0.8547	0.989	1.0105	0.0033	89.44	89.44	1.010	0.8419
0.0536	0.9412	0.3700	0.2487	0.1949	0.8668	0.989	1.0106	0.0033	90.15	90.15	1.010	0.8540
0.0465	0.9561	0.3683	0.2362	0.1894	0.8740	1.001	1.0106	0.0034	87.89	87.89	0.998	0.8720
0.0490	0.9709	0.3708	0.2393	0.1900	0.8722	0.988	1.0106	0.0034	89.59	89.59	1.011	0.8802
0.0516	0.9858	0.3805	0.2427	0.1910	0.8702	0.990	1.0105	0.0034	89.45	89.45	1.009	0.9052
0.1211	1.0007	0.4300	0.3130	0.1919	0.8289	0.979	1.0103	0.0034	85.63	85.63	1.020	0.9147
0.1524	1.0081	0.4507	0.3442	0.1919	0.8098	0.964	1.0103	0.0034	86.36	86.36	1.037	0.9174
0.1502	1.0152	0.4582	0.3429	0.1929	0.8106	0.971	1.0105	0.0034	86.65	86.65	1.029	0.9414
0.0978	1.0229	0.5039	0.3368	0.2389	0.8144	1.040	1.0105	0.0037	80.93	80.93	0.960	1.0562
0.0416	1.0263	0.5282	0.3162	0.2744	0.8269	1.129	1.0105	0.0039	76.59	76.59	0.885	1.1154
-0.0315	1.0291	0.5390	0.2860	0.3171	0.8450	1.228	1.0105	0.0040	75.50	75.50	0.814	1.1443

AXIAL STATION 11 H03S STATOR EXIT STN 11 HP STATOR NO 1

AXIAL DIST	MESH RADIUS ABSOLUTE	MESH RADIUS PERCENT	VELOCITIES MERID	VELOCITIES WHIRL	VELOCITIES TOTAL	TOTAL MACH NO	AIR ANGLES RADIAL	AIR ANGLES WHIRL	AIR ANGLES AXIAL WHIRL	TEMPERATURE STATIC	TEMPERATURE TOTAL	PRESSURES STATIC	PRESSURES TOTAL	MASS FLOW	1/RAD CURV	DEV
4.300	20.400	0.000	62.3	14.3	63.9	0.057	0.00	12.89	12.89	290.9	291.1	15.09	15.12	0.00	0.000	27.92
4.300	20.472	2.000	72.0	12.8	73.2	0.065	0.03	10.08	10.08	290.8	291.1	15.09	15.13	0.34	-0.011	25.09
4.300	20.580	5.000	84.7	8.6	85.2	0.076	0.08	5.83	5.83	290.7	291.0	15.09	15.15	0.93	0.011	20.78
4.300	20.760	10.000	87.8	1.9	87.8	0.078	0.18	1.22	1.22	290.6	291.0	15.09	15.15	2.03	0.071	16.10
4.300	20.940	15.000	89.0	0.7	89.0	0.079	0.23	0.43	0.43	290.6	291.0	15.09	15.15	3.15	0.103	15.23
4.300	21.120	20.000	95.3	-0.9	95.3	0.085	0.21	-0.52	-0.52	290.6	291.0	15.09	15.16	4.34	0.094	14.22
4.300	21.480	30.000	102.7	-0.6	102.7	0.092	0.15	-0.33	-0.33	290.5	291.0	15.09	15.18	6.93	0.059	14.36
4.300	21.840	40.000	103.9	-2.5	104.0	0.093	0.11	-1.38	-1.38	290.5	291.0	15.09	15.18	9.67	0.034	13.31
4.300	22.200	50.000	103.5	-2.3	103.5	0.092	0.08	-1.26	-1.26	290.5	291.0	15.09	15.18	12.47	0.024	13.55
4.300	22.560	60.000	100.6	-3.4	100.6	0.090	0.06	-1.96	-1.96	290.5	291.0	15.09	15.17	15.27	0.014	13.21
4.300	22.920	70.000	98.2	-3.5	98.3	0.088	0.06	-2.05	-2.05	290.5	291.0	15.09	15.17	18.03	-0.004	13.56
4.300	23.280	80.000	92.0	1.7	92.0	0.082	0.05	1.06	1.06	290.6	291.0	15.09	15.16	20.73	-0.026	17.38
4.300	23.460	85.000	89.3	2.8	89.3	0.080	0.06	1.80	1.80	290.6	291.0	15.09	15.15	22.02	-0.049	18.55
4.300	23.640	90.000	88.6	2.2	88.6	0.079	0.11	1.45	1.45	290.6	291.0	15.09	15.15	23.30	-0.069	18.46
4.300	23.838	95.500	79.4	-0.1	79.4	0.071	0.13	-0.04	-0.04	290.8	291.1	15.09	15.14	24.65	-0.064	17.16
4.300	23.928	98.000	74.8	-1.1	74.8	0.067	0.08	-0.80	-0.80	290.9	291.1	15.09	15.13	25.21	-0.043	16.48
4.300	24.000	100.000	70.9	-1.7	70.9	0.063	-0.00	-1.39	-1.39	290.9	291.1	15.09	15.13	25.64	0.000	15.98

AXIAL DIST	STREAM ABSOLUTE	RADIUS PERCENT	<--- VELOCITIES ----> MERID	REL WHIRL	REL TOTAL	MACH NUMBERS MERID	REL TOTAL	AIR REL WHIRL	ANGLES RADIAL	<-- TEMPERATURES ---> STATIC	TOTAL	RELATIVE	<---- PRESSURES ----> STATIC	TOTAL	RELATIVE	INC
0.000	20.400	0.000	57.4	141.4	152.6	0.051	0.136	67.92	0.00	289.8	290.0	290.9	14.97	15.00	15.17	5.71
0.000	20.493	2.582	67.8	141.0	156.4	0.061	0.140	64.31	-0.31	289.8	290.0	290.9	14.97	15.01	15.18	1.99
0.000	20.614	5.941	77.7	142.3	162.2	0.069	0.145	61.36	-0.53	289.7	290.0	290.9	14.97	15.02	15.19	-1.11
0.000	20.796	11.001	80.7	155.0	174.8	0.072	0.156	62.50	-0.66	289.7	290.0	291.1	14.97	15.03	15.23	-0.19
0.000	20.972	15.890	78.3	161.1	179.1	0.070	0.160	64.06	-0.68	289.7	290.0	291.2	14.97	15.02	15.24	1.16
0.000	21.148	20.777	76.3	163.6	180.5	0.068	0.161	65.00	-0.64	289.7	290.0	291.2	14.97	15.02	15.25	1.89
0.000	21.501	30.577	76.1	167.5	184.0	0.068	0.164	65.57	-0.47	289.7	290.0	291.3	14.97	15.02	15.26	2.04
0.000	21.856	40.456	79.8	168.8	186.7	0.071	0.167	64.71	-0.27	289.7	290.0	291.3	14.97	15.03	15.27	0.78
0.000	22.214	50.387	82.2	170.9	189.7	0.073	0.169	64.31	-0.16	289.7	290.0	291.4	14.97	15.03	15.28	-0.04
0.000	22.580	60.554	81.9	176.7	194.7	0.073	0.174	65.13	-0.18	289.7	290.0	291.4	14.97	15.03	15.29	0.38
0.000	22.949	70.811	80.5	179.5	196.7	0.072	0.176	65.84	-0.28	289.7	290.0	291.5	14.97	15.03	15.30	0.70
0.000	23.320	81.118	78.9	178.6	195.2	0.070	0.174	66.16	-0.44	289.7	290.0	291.5	14.98	15.03	15.30	0.63
0.000	23.505	86.260	78.4	178.2	194.7	0.070	0.174	66.26	-0.49	289.7	290.0	291.5	14.98	15.03	15.30	0.54
0.000	23.687	91.315	77.4	179.9	195.9	0.069	0.175	66.73	-0.48	289.7	290.0	291.5	14.98	15.03	15.30	0.81
0.000	23.872	96.448	74.0	188.3	202.3	0.066	0.181	68.56	-0.31	289.7	290.0	291.6	14.98	15.02	15.32	2.47
0.000	23.946	98.497	72.6	191.2	204.5	0.065	0.183	69.21	-0.15	289.8	290.0	291.7	14.98	15.02	15.33	3.04
0.000	24.000	100.000	71.6	193.2	206.0	0.064	0.184	69.68	0.00	289.8	290.0	291.7	14.98	15.02	15.34	3.45

ACROSS THE ROTOR

PRES LOSS COEFF	SPACE CHORD RATIO	DIFFUSION FACTOR	STATIC PRES RISE COEFFS INCOMP	COMP	DE HALLER NUMBER	MERID VELOCITY RATIO	WORK FUNCTIONS DH/U2*U2	FLOW VAM/U	ROTOR PRES RATIO	ROTOR TEMP RATIO	BLADE EFF	STREAM HEIGHT RATIO	LIFT COEFF
-0.1201	0.9111	0.5774	0.5625	0.6808	0.6614	1.3962	0.4993	0.3581	1.0160	0.0041	110.87	0.711	0.5926
-0.0996	0.9142	0.5507	0.5538	0.6495	0.6679	1.1957	0.4656	0.4212	1.0149	0.0038	110.08	0.832	0.6119
-0.0703	0.9188	0.5195	0.5419	0.6071	0.6769	1.0585	0.4292	0.4801	1.0136	0.0036	108.20	0.940	0.6035
0.0753	0.9266	0.5719	0.6004	0.5212	0.6321	0.9729	0.4722	0.4940	1.0128	0.0040	90.89	1.023	0.6349
0.1061	0.9344	0.5784	0.6070	0.4976	0.6269	0.9784	0.4789	0.4755	1.0126	0.0041	86.94	1.018	0.6342
0.1100	0.9423	0.5712	0.6037	0.4907	0.6296	0.9676	0.4640	0.4593	1.0123	0.0041	86.05	1.029	0.6273
0.0974	0.9575	0.5398	0.5749	0.4750	0.6520	0.9859	0.4372	0.4507	1.0121	0.0040	86.83	1.009	0.6061
0.0784	0.9723	0.5064	0.5441	0.4635	0.6752	0.9800	0.4068	0.4646	1.0119	0.0038	88.67	1.015	0.5889
0.0605	0.9880	0.4775	0.5138	0.4510	0.6973	0.9986	0.3850	0.4713	1.0119	0.0037	90.77	0.996	0.5714
0.0772	1.0036	0.4751	0.5081	0.4284	0.7014	1.0205	0.3865	0.4617	1.0120	0.0039	88.04	0.975	0.5713
0.0833	1.0184	0.4723	0.5052	0.4187	0.7034	1.0207	0.3774	0.4467	1.0119	0.0039	86.93	0.975	0.5702
0.0712	1.0336	0.4674	0.4983	0.4230	0.7083	1.0312	0.3633	0.4307	1.0121	0.0039	88.93	0.966	0.5692
0.0882	1.0415	0.4873	0.5168	0.4241	0.6952	1.0136	0.3705	0.4244	1.0122	0.0040	86.81	0.983	0.5904
0.1391	1.0493	0.5369	0.5600	0.4167	0.6633	0.9936	0.4029	0.4159	1.0126	0.0044	80.93	1.003	0.6371
0.2565	1.0579	0.6328	0.6493	0.3905	0.5922	0.8517	0.4600	0.3944	1.0122	0.0051	67.66	1.170	0.7353
0.2930	1.0618	0.6637	0.6768	0.3830	0.5685	0.7792	0.4761	0.3859	1.0120	0.0054	63.81	1.279	0.7816
0.3167	1.0650	0.6837	0.6943	0.3781	0.5529	0.7182	0.4856	0.3796	1.0119	0.0055	61.30	1.386	0.8220

AXIAL DIST	MESH RADIUS ABSOLUTE	MESH RADIUS PERCENT	BLADE SPEED	VELOCITIES MERID	VELOCITIES WHIRL	VELOCITIES TOTAL	VELOCITIES REL WHIRL	VELOCITIES REL TOTAL	MACH NUMBERS TOTAL	MACH NUMBERS REL TOTAL	AIR ANGLES RADIAL	AIR ANGLES WHIRL	ANGLES REL WHIRL	ANGLES REL AXIAL WHIRL	1/RAD CURV
1.400	20.400	0.000	160.24	80.1	98.8	127.2	61.4	100.9	0.113	0.090	0.00	50.97	37.47	37.47	0.000
1.400	20.472	2.000	160.80	81.1	94.9	124.8	65.9	104.5	0.111	0.093	-0.21	49.49	39.11	39.11	0.195
1.400	20.580	5.000	161.65	82.3	89.0	121.2	72.7	109.8	0.108	0.098	-0.37	47.25	41.44	41.44	0.305
1.400	20.760	10.000	163.07	78.5	85.3	116.0	77.7	110.5	0.103	0.099	-0.45	47.39	44.72	44.72	0.305
1.400	20.940	15.000	164.48	76.6	82.4	112.6	82.1	112.3	0.100	0.100	-0.43	47.08	46.95	46.95	0.262
1.400	21.120	20.000	165.89	73.8	79.5	108.5	86.4	113.6	0.097	0.101	-0.38	47.12	49.49	49.49	0.228
1.400	21.480	30.000	168.72	75.0	75.1	106.2	93.6	120.0	0.095	0.107	-0.26	45.02	51.28	51.28	0.175
1.400	21.840	40.000	171.55	78.2	72.6	106.7	98.9	126.1	0.095	0.112	-0.16	42.90	51.69	51.69	0.152
1.400	22.200	50.000	174.38	82.1	70.7	108.4	103.7	132.2	0.097	0.118	-0.12	40.73	51.62	51.62	0.134
1.400	22.560	60.000	177.21	83.6	69.2	108.5	108.0	136.6	0.097	0.122	-0.21	39.63	52.27	52.27	0.181
1.400	22.920	70.000	180.03	82.2	68.7	107.1	111.4	138.4	0.096	0.123	-0.37	39.88	53.57	53.57	0.247
1.400	23.280	80.000	182.86	81.4	71.1	108.0	111.8	138.3	0.096	0.123	-0.54	41.13	53.95	53.96	0.330
1.400	23.460	85.000	184.27	79.4	74.7	109.0	109.6	135.3	0.097	0.121	-0.61	43.25	54.06	54.06	0.374
1.400	23.640	90.000	185.69	76.9	81.0	111.7	104.7	129.9	0.100	0.116	-0.61	46.48	53.71	53.71	0.395
1.400	23.838	95.500	187.24	63.0	85.3	106.0	101.9	119.8	0.095	0.107	-0.42	53.56	58.29	58.29	0.292
1.400	23.928	98.000	187.95	56.6	86.4	103.3	101.6	116.2	0.092	0.104	-0.22	56.79	60.89	60.89	0.153
1.400	24.000	100.000	188.52	51.4	86.9	100.9	101.7	113.9	0.090	0.101	0.00	59.39	63.18	63.18	0.000

PRESSURES STATIC	PRESSURES TOTAL	PRESSURES RELATIVE	TEMPERATURES STATIC	TEMPERATURES TOTAL	TEMPERATURES RELATIVE	MASS FLOW	DEV
15.10	15.24	15.19	290.4	291.2	290.9	0.00	9.55
15.10	15.24	15.20	290.4	291.1	290.9	0.40	10.57
15.11	15.23	15.21	290.4	291.0	290.9	1.02	11.97
15.11	15.22	15.21	290.5	291.2	291.1	2.04	13.68
15.11	15.21	15.21	290.6	291.2	291.2	3.03	14.40
15.11	15.21	15.22	290.6	291.2	291.2	4.00	15.48
15.11	15.20	15.23	290.6	291.2	291.3	5.93	14.50
15.11	15.20	15.24	290.6	291.1	291.3	7.96	12.36
15.11	15.21	15.26	290.5	291.1	291.3	10.12	10.03
15.11	15.21	15.27	290.6	291.1	291.4	12.40	8.80
15.11	15.21	15.27	290.6	291.1	291.5	14.71	8.36
15.11	15.21	15.27	290.6	291.1	291.5	17.03	7.50
15.11	15.21	15.27	290.6	291.2	291.5	18.18	7.26
15.11	15.22	15.25	290.7	291.3	291.5	19.31	7.07
15.11	15.21	15.23	291.0	291.5	291.6	20.44	12.29
15.11	15.20	15.23	291.1	291.6	291.7	20.87	15.18
15.11	15.20	15.22	291.1	291.6	291.7	21.19	17.66

AXIAL DIST	STREAM RADIUS ABSOLUTE	STREAM RADIUS PERCENT	VELOCITIES MERID	VELOCITIES WHIRL	VELOCITIES TOTAL	MACH NUMBERS MERID	MACH NUMBERS TOTAL	AIR ANGLES WHIRL	AIR ANGLES RADIAL	TEMPERATURES STATIC	TEMPERATURES TOTAL	PRESSURES STATIC	PRESSURES TOTAL	INC
2.000	20.400	0.000	80.5	98.8	127.4	0.072	0.114	50.85	-0.00	290.4	291.2	15.10	15.24	11.38
2.000	20.455	1.530	81.2	95.8	125.6	0.072	0.112	49.72	0.06	290.4	291.1	15.10	15.24	10.41
2.000	20.545	4.023	82.3	90.6	122.4	0.073	0.109	47.72	0.12	290.4	291.1	15.10	15.23	8.67
2.000	20.714	8.718	79.6	86.1	117.3	0.071	0.105	47.25	0.16	290.5	291.1	15.11	15.22	8.68
2.000	20.894	13.719	77.1	83.1	113.4	0.069	0.101	47.16	0.17	290.6	291.2	15.11	15.21	9.09
2.000	21.073	18.694	74.1	80.2	109.2	0.066	0.097	47.27	0.18	290.6	291.2	15.11	15.21	9.68
2.000	21.432	28.673	74.6	75.6	106.2	0.067	0.095	45.36	0.24	290.6	291.2	15.11	15.20	8.64
2.000	21.787	38.540	77.5	72.9	106.4	0.069	0.095	43.27	0.31	290.6	291.1	15.11	15.20	7.27
2.000	22.140	48.344	81.6	71.0	108.2	0.073	0.096	41.03	0.37	290.5	291.1	15.11	15.21	5.62
2.000	22.492	58.105	83.6	69.4	108.7	0.075	0.097	39.68	0.40	290.6	291.1	15.11	15.21	4.47
2.000	22.848	68.001	82.7	68.7	107.5	0.074	0.096	39.72	0.37	290.6	291.1	15.11	15.21	4.45
2.000	23.210	78.043	81.8	70.3	107.9	0.073	0.096	40.67	0.30	290.6	291.1	15.11	15.21	5.26
2.000	23.390	83.045	80.4	73.0	108.6	0.072	0.097	42.23	0.27	290.6	291.1	15.11	15.21	6.74
2.000	23.571	88.093	78.3	78.7	111.0	0.070	0.099	45.14	0.25	290.7	291.2	15.11	15.22	9.55
2.000	23.787	94.086	66.6	84.4	107.5	0.059	0.096	51.73	0.17	290.9	291.4	15.11	15.21	16.00
2.000	23.898	97.175	58.3	86.1	104.0	0.052	0.093	55.90	0.10	291.0	291.5	15.11	15.20	20.10
2.000	24.000	100.000	51.0	86.9	100.7	0.045	0.090	59.58	0.00	291.1	291.6	15.11	15.20	23.72

ACROSS THE STATOR

PRES LOSS COEFF	SPACE CHORD RATIO	DIFFUSION FACTOR	STATIC PRES RISE COEFFS INCOMP	STATIC PRES RISE COEFFS COMP	DE HALLER NUMBER	MERID VELOCITY RATIO	STAGE PRES RATIO	STAGE TEMP RATIO	EFFICIENCIES STAGE	EFFICIENCIES ACCUM	STREAM HEIGHT RATIO	LIFT COEFF
0.5227	0.8818	0.7911	0.7639	0.2418	0.4859	0.734	1.0112	0.0041	77.80	77.80	1.363	0.8464
0.4662	0.8847	0.7311	0.7117	0.2460	0.5370	0.794	1.0110	0.0039	80.20	80.20	1.257	0.8303
0.3729	0.8892	0.6494	0.6336	0.2611	0.6053	0.865	1.0108	0.0036	84.69	84.69	1.153	0.8078
0.2604	0.8966	0.5900	0.5297	0.2695	0.6858	0.995	1.0109	0.0039	79.70	79.70	1.002	0.8542
0.2543	0.9041	0.6323	0.5408	0.2867	0.6777	0.994	1.0108	0.0041	74.80	74.80	1.003	0.9356
0.2421	0.9115	0.6502	0.5464	0.3044	0.6735	0.992	1.0108	0.0041	74.98	74.98	1.005	0.9676
0.2028	0.9263	0.6200	0.5129	0.3102	0.6979	0.993	1.0108	0.0040	77.39	77.39	1.004	0.9768
0.1942	0.9412	0.6010	0.4966	0.3025	0.7095	0.974	1.0107	0.0038	79.26	79.26	1.023	0.9811
0.1673	0.9561	0.5578	0.4522	0.2850	0.7401	0.980	1.0108	0.0037	82.19	82.19	1.016	0.9695
0.1601	0.9709	0.5508	0.4433	0.2833	0.7461	0.969	1.0109	0.0039	80.70	80.70	1.028	0.9795
0.1150	0.9858	0.5351	0.4080	0.2929	0.7694	1.000	1.0112	0.0039	81.52	81.52	0.996	1.0027
0.1370	1.0007	0.5436	0.4245	0.2875	0.7586	0.998	1.0112	0.0039	82.04	82.04	0.998	0.9912
0.1606	1.0081	0.5543	0.4503	0.2897	0.7414	0.995	1.0111	0.0039	80.45	80.45	1.001	0.9635
0.1894	1.0152	0.5836	0.4666	0.2773	0.7303	1.028	1.0112	0.0042	75.03	75.03	0.969	0.9880
0.1746	1.0229	0.6366	0.4646	0.2900	0.7317	1.177	1.0112	0.0050	64.20	64.20	0.847	1.0385
0.1354	1.0263	0.6514	0.4437	0.3082	0.7459	1.327	1.0113	0.0053	60.56	60.56	0.752	1.0294
0.0969	1.0291	0.6590	0.4200	0.3229	0.7616	1.502	1.0113	0.0055	58.47	58.47	0.665	0.9989

AXIAL STATION 11 H03S STATOR EXIT STN 11 HP STATOR NO 1

AXIAL DIST	MESH RADIUS ABSOLUTE	PERCENT	<--- VELOCITIES ---> MERID	WHIRL	TOTAL	TOTAL MACH NO	<--- AIR ANGLES ---> RADIAL	WHIRL	AXIAL WHIRL	TEMPERATURE STATIC	TOTAL	PRESSURES STATIC	TOTAL	MASS FLOW	1/RAD CURV	DEV
4.300	20.400	0.000	59.0	18.7	61.9	0.055	0.00	17.61	17.61	291.0	291.2	15.14	15.17	0.00	0.000	32.65
4.300	20.472	2.000	64.5	19.7	67.4	0.060	0.10	16.95	16.95	290.9	291.1	15.14	15.18	0.31	-0.059	31.95
4.300	20.580	5.000	71.2	20.3	74.1	0.066	0.23	15.94	15.94	290.8	291.1	15.14	15.18	0.82	-0.118	30.90
4.300	20.760	10.000	79.2	13.9	80.4	0.072	0.44	9.92	9.92	290.8	291.1	15.14	15.19	1.79	-0.129	24.79
4.300	20.940	15.000	76.7	5.3	76.8	0.068	0.61	3.95	3.95	290.9	291.2	15.14	15.19	2.79	-0.098	18.76
4.300	21.120	20.000	73.5	2.6	73.5	0.066	0.67	2.00	2.00	290.9	291.2	15.14	15.18	3.75	-0.091	16.74
4.300	21.480	30.000	74.1	2.6	74.1	0.066	0.72	2.00	2.00	290.9	291.2	15.14	15.18	5.67	-0.086	16.69
4.300	21.840	40.000	75.5	2.6	75.5	0.067	0.77	2.00	2.00	290.8	291.1	15.14	15.19	7.65	-0.097	16.69
4.300	22.200	50.000	80.0	3.5	80.0	0.071	0.83	2.50	2.50	290.8	291.1	15.14	15.19	9.75	-0.118	17.31
4.300	22.560	60.000	81.0	2.8	81.1	0.072	0.86	2.00	2.00	290.8	291.1	15.14	15.19	11.96	-0.153	17.17
4.300	22.920	70.000	82.7	2.2	82.7	0.074	0.86	1.50	1.50	290.8	291.1	15.14	15.20	14.25	-0.171	17.12
4.300	23.280	80.000	81.7	5.0	81.8	0.073	0.76	3.53	3.53	290.8	291.1	15.14	15.20	16.58	-0.181	19.84
4.300	23.460	85.000	80.0	9.2	80.5	0.072	0.68	6.53	6.53	290.8	291.1	15.14	15.20	17.74	-0.195	23.28
4.300	23.640	90.000	80.5	9.9	81.1	0.072	0.56	7.02	7.02	290.9	291.2	15.14	15.20	18.90	-0.209	24.03
4.300	23.838	95.500	78.4	6.9	78.7	0.070	0.34	5.01	5.01	291.2	291.4	15.14	15.19	20.17	-0.170	22.21
4.300	23.928	98.000	77.4	5.6	77.6	0.069	0.17	4.11	4.11	291.3	291.5	15.14	15.19	20.74	-0.104	21.40
4.300	24.000	100.000	76.6	4.5	76.7	0.068	-0.00	3.38	3.38	291.3	291.6	15.14	15.19	21.19	0.000	20.75

7.2 DCA Datum with Inviscid End-Bends

AXIAL DIST	STREAM ABSOLUTE	RADIUS PERCENT	<--- VELOCITIES ----> MERID	REL WHIRL	REL TOTAL	MACH NUMBERS MERID	REL TOTAL	AIR REL WHIRL	ANGLES RADIAL	<-- TEMPERATURES ---> STATIC	TOTAL	RELATIVE	<---- PRESSURES ----> STATIC	TOTAL	RELATIVE	INC
0.000	20.400	0.000	65.5	143.8	158.0	0.058	0.141	65.52	0.00	289.8	290.0	290.9	14.92	14.96	15.13	-6.66
0.000	20.486	2.377	79.5	145.1	165.5	0.071	0.148	61.30	-0.16	289.7	290.0	291.0	14.93	14.98	15.15	-8.32
0.000	20.595	5.412	93.1	149.3	176.0	0.083	0.157	58.06	-0.23	289.6	290.0	291.0	14.93	15.00	15.18	-9.57
0.000	20.768	10.235	95.0	157.3	183.8	0.085	0.164	58.87	-0.26	289.6	290.0	291.1	14.93	15.00	15.21	-5.69
0.000	20.948	15.230	95.1	162.5	188.3	0.085	0.168	59.65	-0.32	289.6	290.0	291.2	14.93	15.00	15.22	-3.32
0.000	21.132	20.326	97.6	165.5	192.2	0.087	0.172	59.49	-0.41	289.6	290.0	291.3	14.93	15.00	15.24	-3.56
0.000	21.498	30.492	103.4	168.3	197.6	0.092	0.177	58.43	-0.59	289.5	290.0	291.3	14.93	15.01	15.25	-5.09
0.000	21.862	40.612	102.6	173.3	201.4	0.092	0.180	59.36	-0.75	289.5	290.0	291.4	14.93	15.01	15.27	-4.59
0.000	22.228	50.778	101.1	177.9	204.6	0.090	0.183	60.39	-0.91	289.5	290.0	291.5	14.93	15.01	15.28	-3.98
0.000	22.596	61.001	96.4	180.9	205.0	0.086	0.183	61.94	-1.06	289.6	290.0	291.5	14.93	15.00	15.28	-2.82
0.000	22.964	71.234	93.5	183.2	205.7	0.084	0.184	62.97	-1.15	289.6	290.0	291.6	14.93	15.00	15.28	-2.16
0.000	23.331	81.404	90.1	183.4	204.3	0.081	0.183	63.83	-1.14	289.6	290.0	291.6	14.93	15.00	15.28	-1.67
0.000	23.513	86.470	87.1	181.5	201.3	0.078	0.180	64.35	-1.07	289.6	290.0	291.5	14.93	14.99	15.27	-1.82
0.000	23.693	91.464	81.9	182.1	199.7	0.073	0.178	65.77	-0.90	289.7	290.0	291.5	14.93	14.99	15.26	-2.75
0.000	23.872	96.452	72.6	187.5	201.0	0.065	0.180	68.83	-0.52	289.8	290.0	291.6	14.93	14.97	15.27	-3.64
0.000	23.945	98.484	63.5	190.4	200.7	0.057	0.179	71.57	-0.26	289.8	290.0	291.7	14.93	14.96	15.27	-4.11
0.000	24.000	100.000	55.6	191.8	199.7	0.050	0.178	73.84	0.00	289.9	290.0	291.7	14.93	14.96	15.27	-5.45

ACROSS THE ROTOR

PRES LOSS COEFF	SPACE CHORD RATIO	DIFFUSION FACTOR	STATIC PRES RISE COEFFS INCOMP	COMP	DE HALLER NUMBER	MERID VELOCITY RATIO	WORK FUNCTIONS DH/U2*U2	FLOW VAM/U	ROTOR PRES RATIO	ROTOR TEMP RATIO	BLADE EFF	STREAM HEIGHT RATIO	LIFT COEFF
-0.1106	0.9110	0.5418	0.5349	0.6436	0.6820	1.2989	0.4842	0.4083	1.0155	0.0040	111.04	0.765	0.5986
-0.0578	0.9141	0.5166	0.5328	0.5876	0.6835	1.0920	0.4505	0.4936	1.0140	0.0037	106.75	0.910	0.6056
0.0037	0.9187	0.4873	0.5273	0.5209	0.6876	0.9538	0.4143	0.5751	1.0121	0.0035	99.48	1.043	0.5808
0.0122	0.9264	0.4522	0.4933	0.4789	0.7118	0.9771	0.3988	0.5820	1.0117	0.0034	98.07	1.017	0.5488
0.0169	0.9341	0.4398	0.4769	0.4578	0.7233	1.0084	0.3997	0.5779	1.0118	0.0035	97.25	0.986	0.5406
0.0185	0.9418	0.4264	0.4620	0.4411	0.7335	1.0159	0.3932	0.5875	1.0118	0.0035	96.88	0.979	0.5321
0.0098	0.9572	0.3957	0.4319	0.4191	0.7537	1.0062	0.3654	0.6122	1.0115	0.0033	98.18	0.988	0.5086
0.0152	0.9725	0.3857	0.4226	0.4042	0.7599	1.0081	0.3516	0.5974	1.0113	0.0033	97.06	0.987	0.4981
0.0209	0.9880	0.3794	0.4160	0.3915	0.7642	1.0135	0.3413	0.5786	1.0112	0.0033	95.83	0.982	0.4917
0.0162	1.0033	0.3716	0.4088	0.3884	0.7689	1.0201	0.3242	0.5431	1.0110	0.0033	96.69	0.976	0.4810
0.0288	1.0187	0.3788	0.4165	0.3830	0.7639	1.0159	0.3204	0.5181	1.0110	0.0033	94.20	0.980	0.4882
0.0549	1.0342	0.4080	0.4440	0.3842	0.7457	1.0097	0.3323	0.4916	1.0112	0.0035	89.78	0.986	0.5199
0.0576	1.0419	0.4214	0.4566	0.3939	0.7372	1.0068	0.3327	0.4715	1.0114	0.0036	89.77	0.990	0.5340
0.0944	1.0496	0.4609	0.4975	0.3984	0.7088	0.9720	0.3480	0.4401	1.0114	0.0038	84.47	1.025	0.5705
0.1842	1.0581	0.5396	0.5791	0.3923	0.6487	0.8322	0.3823	0.3869	1.0109	0.0043	72.48	1.197	0.6590
0.2042	1.0619	0.5608	0.5994	0.3938	0.6329	0.7789	0.3896	0.3373	1.0109	0.0044	70.36	1.278	0.6942
0.1977	1.0650	0.5563	0.5966	0.3987	0.6351	0.7376	0.3806	0.2948	1.0108	0.0043	71.10	1.349	0.7083

AXIAL DIST	MESH RADIUS ABSOLUTE	PERCENT	BLADE SPEED	VELOCITIES MERID	WHIRL	TOTAL	REL WHIRL	REL TOTAL	MACH NUMBERS TOTAL	REL TOTAL	AIR ANGLES RADIAL	WHIRL	REL WHIRL	REL AXIAL WHIRL	1/RAD CURV
1.400	20.400	0.000	160.31	85.0	94.1	126.9	66.2	107.7	0.113	0.096	0.00	47.91	37.89	37.89	0.000
1.400	20.472	2.000	160.88	86.8	88.3	123.8	72.5	113.1	0.110	0.101	-0.14	45.51	39.90	39.90	0.124
1.400	20.580	5.000	161.72	88.8	79.5	119.2	82.2	121.0	0.106	0.108	-0.20	41.86	42.80	42.80	0.122
1.400	20.760	10.000	163.14	92.8	71.0	116.8	92.2	130.8	0.104	0.117	-0.21	37.41	44.80	44.80	0.041
1.400	20.940	15.000	164.55	95.9	67.9	117.5	96.7	136.2	0.105	0.122	-0.25	35.28	45.22	45.22	0.025
1.400	21.120	20.000	165.97	99.1	65.8	118.9	100.2	140.9	0.106	0.126	-0.33	33.57	45.31	45.31	0.046
1.400	21.480	30.000	168.80	104.1	62.3	121.3	106.5	148.9	0.108	0.133	-0.46	30.90	45.67	45.67	0.078
1.400	21.840	40.000	171.63	103.5	58.9	119.1	112.7	153.0	0.106	0.137	-0.58	29.64	47.46	47.46	0.097
1.400	22.200	50.000	174.46	102.4	56.3	116.9	118.1	156.4	0.104	0.140	-0.70	28.81	49.07	49.07	0.133
1.400	22.560	60.000	177.28	98.4	54.1	112.3	123.2	157.6	0.100	0.141	-0.84	28.81	51.39	51.39	0.191
1.400	22.920	70.000	180.11	95.0	54.9	109.7	125.2	157.1	0.098	0.140	-0.95	30.04	52.81	52.81	0.259
1.400	23.280	80.000	182.94	91.0	60.7	109.4	122.2	152.4	0.098	0.136	-1.00	33.71	53.33	53.33	0.320
1.400	23.460	85.000	184.36	87.7	64.7	109.0	119.7	148.4	0.097	0.132	-0.99	36.40	53.77	53.77	0.353
1.400	23.640	90.000	185.77	79.6	68.8	105.2	117.0	141.5	0.094	0.126	-0.92	40.81	55.75	55.76	0.369
1.400	23.838	95.500	187.33	60.4	71.8	93.8	115.6	130.4	0.084	0.116	-0.59	49.91	62.41	62.41	0.243
1.400	23.928	98.000	188.03	49.4	71.0	86.5	117.0	127.1	0.077	0.113	-0.32	55.15	67.10	67.10	0.118
1.400	24.000	100.000	188.60	41.0	68.6	79.9	120.0	126.9	0.071	0.113	0.00	59.11	71.14	71.14	0.000

PRESSURES STATIC	TOTAL	RELATIVE	TEMPERATURES STATIC	TOTAL	RELATIVE	MASS FLOW	DEV
15.06	15.19	15.16	290.4	291.2	290.9	0.00	8.72
15.06	15.19	15.17	290.4	291.1	291.0	0.43	10.05
15.06	15.18	15.18	290.3	291.0	291.0	1.09	12.27
15.06	15.18	15.21	290.4	291.0	291.1	2.24	13.05
15.06	15.18	15.22	290.4	291.0	291.2	3.44	12.70
15.06	15.18	15.23	290.3	291.0	291.3	4.69	11.30
15.06	15.19	15.25	290.3	291.0	291.3	7.35	8.91
15.06	15.18	15.26	290.3	291.0	291.4	10.10	8.14
15.06	15.18	15.27	290.3	291.0	291.5	12.87	7.48
15.06	15.17	15.27	290.4	290.9	291.5	15.62	7.98
15.06	15.17	15.27	290.4	291.0	291.5	18.31	7.68
15.06	15.16	15.26	290.5	291.0	291.5	20.93	6.98
15.06	15.16	15.25	290.5	291.0	291.5	22.21	6.92
15.06	15.16	15.23	290.6	291.1	291.5	23.42	7.85
15.06	15.14	15.21	290.8	291.2	291.6	24.55	13.09
15.06	15.13	15.20	290.9	291.3	291.7	24.95	17.11
15.06	15.12	15.20	291.0	291.3	291.7	25.21	19.74

AXIAL DIST	STREAM RADIUS ABSOLUTE	STREAM RADIUS PERCENT	<--- VELOCITIES ---> MERID	VELOCITIES WHIRL	VELOCITIES TOTAL	MACH NUMBERS MERID	MACH NUMBERS TOTAL	AIR ANGLES WHIRL	AIR ANGLES RADIAL	TEMPERATURES STATIC	TEMPERATURES TOTAL	PRESSURES STATIC	PRESSURES TOTAL	INC
2.000	20.400	0.000	85.5	94.1	127.2	0.076	0.113	47.75	-0.00	290.4	291.2	15.06	15.19	-10.26
2.000	20.463	1.763	87.1	89.0	124.5	0.078	0.111	45.63	0.00	290.4	291.1	15.06	15.19	-9.35
2.000	20.572	4.775	89.0	80.0	119.7	0.079	0.107	41.95	-0.03	290.3	291.0	15.06	15.18	-7.82
2.000	20.758	9.944	93.1	71.0	117.1	0.083	0.104	37.32	-0.10	290.3	291.0	15.06	15.18	-5.51
2.000	20.938	14.933	96.2	67.9	117.8	0.086	0.105	35.20	-0.15	290.4	291.0	15.06	15.18	-2.95
2.000	21.116	19.888	99.4	65.8	119.2	0.089	0.106	33.50	-0.18	290.3	291.0	15.06	15.18	-3.93
2.000	21.476	29.879	104.4	62.3	121.5	0.093	0.108	30.84	-0.26	290.3	291.0	15.06	15.19	-5.80
2.000	21.834	39.828	103.7	58.9	119.3	0.093	0.106	29.59	-0.31	290.3	291.0	15.06	15.18	-6.32
2.000	22.188	49.675	102.7	56.4	117.2	0.092	0.105	28.77	-0.34	290.3	291.0	15.06	15.18	-6.63
2.000	22.539	59.421	98.7	54.1	112.6	0.088	0.100	28.74	-0.34	290.4	290.9	15.06	15.17	-6.49
2.000	22.889	69.126	95.3	54.8	109.9	0.085	0.098	29.91	-0.30	290.4	291.0	15.06	15.17	-5.36
2.000	23.235	78.763	91.4	60.0	109.3	0.082	0.098	33.28	-0.22	290.5	291.0	15.06	15.16	-2.06
2.000	23.409	83.587	88.6	63.7	109.1	0.079	0.097	35.70	-0.17	290.5	291.0	15.06	15.16	0.18
2.000	23.586	88.495	82.2	67.8	106.5	0.073	0.095	39.52	-0.12	290.6	291.1	15.06	15.16	1.34
2.000	23.800	94.457	63.4	71.6	95.7	0.057	0.085	48.46	-0.07	290.8	291.2	15.06	15.14	1.84
2.000	23.910	97.488	50.5	71.3	87.3	0.045	0.078	54.67	-0.05	290.9	291.3	15.06	15.13	2.97
2.000	24.000	100.000	39.8	68.6	79.3	0.035	0.071	59.86	0.00	291.0	291.3	15.06	15.12	0.96

ACROSS THE STATOR

PRES LOSS COEFF	SPACE CHORD RATIO	DIFFUSION FACTOR	STATIC PRES RISE COEFFS INCOMP	STATIC PRES RISE COEFFS COMP	DE HALLER NUMBER	MERID VELOCITY RATIO	STAGE PRES RATIO	STAGE TEMP RATIO	<-EFFICIENCIES-> STAGE	<-EFFICIENCIES-> ACCUM	STREAM HEIGHT RATIO	LIFT COEFF
0.4332	0.8820	0.6867	0.6672	0.2346	0.5769	0.831	1.0116	0.0040	82.92	82.92	1.202	0.8273
0.3193	0.8850	0.5945	0.5606	0.2417	0.6629	0.929	1.0113	0.0037	86.23	86.23	1.076	0.8202
0.1192	0.8895	0.4620	0.3763	0.2570	0.7898	1.053	1.0112	0.0035	91.99	91.99	0.948	0.8245
0.0953	0.8968	0.4551	0.3570	0.2615	0.8019	1.007	1.0109	0.0034	91.93	91.93	0.991	0.8689
0.0938	0.9043	0.4468	0.3460	0.2521	0.8087	0.990	1.0111	0.0035	91.25	91.25	1.009	0.8782
0.0755	0.9116	0.4226	0.3167	0.2410	0.8266	0.991	1.0112	0.0035	91.94	91.94	1.007	0.8690
0.0402	0.9264	0.3784	0.2635	0.2230	0.8582	1.000	1.0111	0.0033	95.36	95.36	0.999	0.8431
0.0339	0.9412	0.3793	0.2596	0.2254	0.8604	0.989	1.0110	0.0033	94.74	94.74	1.009	0.8605
0.0360	0.9561	0.3903	0.2671	0.2308	0.8561	0.976	1.0109	0.0033	93.49	93.49	1.023	0.8878
0.0223	0.9709	0.4013	0.2729	0.2502	0.8527	0.971	1.0109	0.0033	95.30	95.30	1.027	0.9145
0.0316	0.9857	0.4231	0.2992	0.2672	0.8371	0.965	1.0107	0.0033	92.54	92.54	1.033	0.9302
0.0810	1.0005	0.4745	0.3579	0.2767	0.8013	0.959	1.0106	0.0035	85.72	85.72	1.040	0.9628
0.0952	1.0079	0.4917	0.3788	0.2835	0.7881	0.970	1.0107	0.0036	84.90	84.90	1.028	0.9617
0.1040	1.0153	0.5299	0.4050	0.3008	0.7714	0.998	1.0107	0.0038	81.50	81.50	0.998	0.9993
0.0129	1.0234	0.5892	0.3820	0.3687	0.7861	1.185	1.0109	0.0042	73.66	73.66	0.841	1.0972
0.0366	1.0271	0.7051	0.4784	0.4415	0.7222	1.249	1.0107	0.0044	69.48	69.48	0.799	1.1066
0.0744	1.0300	0.8325	0.6042	0.5296	0.6291	1.251	1.0105	0.0043	69.39	69.39	0.798	1.0550

AXIAL STATION 11 H03S STATOR EXIT STN 11 HP STATOR NO 1

AXIAL DIST	MESH RADIUS ABSOLUTE	PERCENT	<--- VELOCITIES ---> MERID	WHIRL	TOTAL	TOTAL MACH NO	<--- AIR ANGLES ---> RADIAL	WHIRL	AXIAL WHIRL	TEMPERATURE STATIC	TOTAL	PRESSURES STATIC	TOTAL	MASS FLOW	1/RAD CURV	DEV
4.300	20.400	0.000	71.1	18.1	73.4	0.065	0.00	14.30	14.30	290.9	291.2	15.09	15.14	0.00	0.000	29.35
4.300	20.472	2.000	80.8	16.6	82.5	0.074	0.08	11.57	11.57	290.8	291.1	15.09	15.15	0.38	-0.025	26.58
4.300	20.580	5.000	93.7	12.2	94.5	0.084	0.17	7.44	7.44	290.6	291.0	15.09	15.17	1.04	-0.007	22.40
4.300	20.760	10.000	93.8	3.9	93.9	0.084	0.30	2.38	2.38	290.6	291.0	15.09	15.16	2.23	0.045	17.25
4.300	20.940	15.000	95.2	1.3	95.2	0.085	0.38	0.80	0.80	290.6	291.0	15.09	15.17	3.44	0.058	15.59
4.300	21.120	20.000	98.5	0.6	98.5	0.088	0.36	0.35	0.35	290.6	291.0	15.09	15.17	4.68	0.048	15.09
4.300	21.480	30.000	104.3	0.2	104.3	0.093	0.27	0.13	0.13	290.5	291.0	15.09	15.18	7.34	0.029	14.81
4.300	21.840	40.000	102.6	-1.9	102.6	0.092	0.23	-1.04	-1.04	290.5	291.0	15.09	15.18	10.09	0.013	13.64
4.300	22.200	50.000	100.2	-4.0	100.3	0.089	0.20	-2.30	-2.30	290.5	291.0	15.09	15.17	12.82	-0.017	12.52
4.300	22.560	60.000	95.9	-4.8	96.0	0.086	0.19	-2.87	-2.87	290.5	290.9	15.09	15.17	15.51	-0.060	12.30
4.300	22.920	70.000	92.0	-3.3	92.0	0.082	0.16	-2.04	-2.04	290.6	291.0	15.09	15.16	18.12	-0.114	13.64
4.300	23.280	80.000	87.6	-0.3	87.6	0.078	0.09	-0.22	-0.22	290.7	291.0	15.09	15.16	20.66	-0.186	16.14
4.300	23.460	85.000	85.9	3.0	86.0	0.077	0.10	2.00	2.00	290.7	291.0	15.09	15.15	21.90	-0.212	18.75
4.300	23.640	90.000	82.1	4.5	82.2	0.073	0.21	3.12	3.12	290.8	291.1	15.09	15.15	23.11	-0.208	20.25
4.300	23.838	95.500	75.2	1.4	75.2	0.067	0.22	1.05	1.05	291.0	291.2	15.09	15.14	24.37	-0.129	18.63
4.300	23.928	98.000	63.1	-1.4	63.1	0.056	0.14	-1.31	-1.31	291.1	291.3	15.09	15.13	24.88	-0.058	16.51
4.300	24.000	100.000	49.8	-2.5	49.9	0.044	-0.00	-2.88	-2.88	291.1	291.3	15.09	15.11	25.21	0.000	15.12

AXIAL DIST	STREAM ABSOLUTE	RADIUS PERCENT	<--- VELOCITIES ----> MERID	REL WHIRL	REL TOTAL	MACH NUMBERS MERID	REL TOTAL	AIR REL WHIRL	ANGLES RADIAL	<-- TEMPERATURES ---> STATIC	TOTAL	RELATIVE	<---- PRESSURES ----> STATIC	TOTAL	RELATIVE	INC
0.000	20.400	0.000	54.0	139.1	149.2	0.048	0.133	68.80	0.00	290.1	290.3	291.2	14.97	15.00	15.16	-3.42
0.000	20.495	2.645	69.7	140.0	156.4	0.062	0.140	63.53	-0.33	290.1	290.3	291.2	14.97	15.02	15.18	-5.88
0.000	20.611	5.873	82.7	145.7	167.6	0.074	0.150	60.42	-0.52	290.0	290.3	291.3	14.97	15.03	15.21	-6.89
0.000	20.790	10.842	84.7	156.6	178.1	0.076	0.159	61.60	-0.64	290.0	290.3	291.4	14.98	15.04	15.24	-2.68
0.000	20.970	15.822	83.2	162.7	182.7	0.074	0.163	62.91	-0.73	290.0	290.3	291.5	14.98	15.03	15.26	-0.06
0.000	21.150	20.830	81.8	165.9	184.9	0.073	0.165	63.76	-0.79	290.0	290.3	291.6	14.98	15.03	15.26	0.70
0.000	21.511	30.867	80.9	168.9	187.3	0.072	0.167	64.42	-0.89	290.0	290.3	291.6	14.98	15.03	15.27	0.88
0.000	21.874	40.947	80.6	171.9	189.9	0.072	0.170	64.87	-0.96	290.0	290.3	291.7	14.98	15.03	15.28	0.90
0.000	22.237	51.036	82.4	174.8	193.2	0.074	0.173	64.74	-1.00	290.0	290.3	291.7	14.98	15.03	15.29	0.36
0.000	22.601	61.131	81.8	177.9	195.8	0.073	0.175	65.32	-1.04	290.0	290.3	291.8	14.98	15.03	15.30	0.55
0.000	22.966	71.280	77.9	180.9	197.0	0.070	0.176	66.71	-1.07	290.0	290.3	291.8	14.98	15.03	15.31	1.58
0.000	23.332	81.434	78.8	181.6	198.0	0.070	0.177	66.55	-1.04	290.0	290.3	291.8	14.98	15.03	15.31	1.05
0.000	23.515	86.540	75.6	180.9	196.0	0.067	0.175	67.32	-1.00	290.0	290.3	291.8	14.98	15.03	15.30	1.13
0.000	23.691	91.422	75.0	179.6	194.7	0.067	0.174	67.34	-0.83	290.0	290.3	291.8	14.98	15.03	15.30	-1.16
0.000	23.867	96.311	69.2	180.7	193.5	0.062	0.173	69.05	-0.48	290.1	290.3	291.8	14.98	15.02	15.30	-3.25
0.000	23.943	98.417	56.0	182.7	191.1	0.050	0.171	72.95	-0.25	290.2	290.3	291.8	14.98	15.01	15.29	-2.58
0.000	24.000	100.000	46.2	184.2	189.9	0.041	0.169	75.91	0.00	290.2	290.3	291.9	14.98	15.00	15.28	-3.38

ACROSS THE ROTOR

PRES LOSS COEFF	SPACE CHORD RATIO	DIFFUSION FACTOR	STATIC PRES RISE COEFFS INCOMP	COMP	DE HALLER NUMBER	MERID VELOCITY RATIO	WORK FUNCTIONS DH/U2*U2	FLOW FUNCTIONS VAM/U	ROTOR PRES RATIO	ROTOR TEMP RATIO	BLADE EFF	STREAM HEIGHT RATIO	LIFT COEFF
-0.2323	0.9110	0.5494	0.5300	0.7599	0.6856	1.5058	0.4778	0.3350	1.0168	0.0040	120.76	0.659	0.5661
-0.1588	0.9141	0.5324	0.5389	0.6931	0.6791	1.1777	0.4479	0.4307	1.0153	0.0037	116.51	0.844	0.6051
-0.0583	0.9187	0.5224	0.5516	0.6052	0.6696	1.0053	0.4313	0.5081	1.0137	0.0036	107.14	0.989	0.6065
0.0213	0.9264	0.5269	0.5604	0.5353	0.6630	0.9880	0.4457	0.5157	1.0130	0.0038	97.21	1.007	0.6039
0.0508	0.9341	0.5298	0.5635	0.5092	0.6607	0.9946	0.4509	0.5025	1.0129	0.0039	93.16	1.000	0.6020
0.0548	0.9418	0.5203	0.5562	0.4978	0.6662	0.9976	0.4395	0.4896	1.0127	0.0039	92.38	0.997	0.5923
0.0603	0.9572	0.5156	0.5510	0.4871	0.6701	1.0004	0.4287	0.4759	1.0126	0.0039	91.49	0.995	0.5912
0.0582	0.9725	0.5017	0.5372	0.4752	0.6803	1.0057	0.4122	0.4668	1.0126	0.0039	91.51	0.989	0.5831
0.0490	0.9880	0.4750	0.5124	0.4593	0.6983	1.0032	0.3870	0.4695	1.0123	0.0038	92.38	0.992	0.5656
0.0560	1.0033	0.4702	0.5067	0.4464	0.7024	1.0062	0.3782	0.4581	1.0123	0.0038	91.14	0.989	0.5642
0.0574	1.0187	0.4656	0.5026	0.4405	0.7053	1.0115	0.3653	0.4294	1.0122	0.0038	90.77	0.984	0.5588
0.0646	1.0342	0.4700	0.5038	0.4341	0.7044	1.0135	0.3637	0.4276	1.0124	0.0039	89.79	0.983	0.5694
0.0570	1.0419	0.4680	0.5030	0.4404	0.7050	1.0095	0.3519	0.4070	1.0123	0.0039	91.01	0.987	0.5667
0.1008	1.0496	0.5162	0.5515	0.4457	0.6697	0.9292	0.3698	0.4009	1.0123	0.0041	85.29	1.072	0.6208
0.1533	1.0581	0.5771	0.6079	0.4517	0.6262	0.8473	0.3952	0.3669	1.0125	0.0045	79.66	1.175	0.6897
0.0960	1.0619	0.5183	0.5623	0.4642	0.6616	0.8190	0.3427	0.2963	1.0118	0.0039	85.80	1.214	0.6427
0.0202	1.0650	0.4381	0.4929	0.4711	0.7121	0.7569	0.2826	0.2438	1.0110	0.0032	96.44	1.312	0.5825

AXIAL DIST	MESH RADIUS ABSOLUTE	PERCENT	BLADE SPEED	VELOCITIES MERID	WHIRL	TOTAL	REL WHIRL	REL TOTAL	MACH NUMBERS TOTAL	REL TOTAL	AIR ANGLES RADIAL	WHIRL	REL WHIRL	REL AXIAL WHIRL	1/RAD CURV
1.400	20.400	0.000	161.11	81.3	99.0	128.0	62.2	102.3	0.114	0.091	0.00	50.61	37.41	37.41	0.000
1.400	20.472	2.000	161.68	82.1	94.3	125.0	67.4	106.2	0.111	0.095	-0.24	48.96	39.38	39.38	0.214
1.400	20.580	5.000	162.53	83.1	87.2	120.5	75.3	112.2	0.107	0.100	-0.38	46.36	42.18	42.18	0.271
1.400	20.760	10.000	163.95	83.7	80.7	116.2	83.3	118.1	0.104	0.105	-0.46	43.95	44.88	44.88	0.233
1.400	20.940	15.000	165.38	82.8	77.5	113.4	87.9	120.7	0.101	0.108	-0.51	43.11	46.72	46.72	0.209
1.400	21.120	20.000	166.80	81.6	74.5	110.5	92.3	123.2	0.098	0.110	-0.55	42.39	48.54	48.54	0.200
1.400	21.480	30.000	169.64	80.9	73.7	109.4	95.9	125.5	0.098	0.112	-0.63	42.34	49.87	49.87	0.194
1.400	21.840	40.000	172.48	81.1	72.0	108.4	100.5	129.2	0.097	0.115	-0.71	41.58	51.10	51.10	0.205
1.400	22.200	50.000	175.33	82.7	68.7	107.5	106.6	134.9	0.096	0.120	-0.79	39.72	52.20	52.20	0.221
1.400	22.560	60.000	178.17	82.3	68.0	106.7	110.2	137.5	0.095	0.123	-0.85	39.57	53.25	53.26	0.245
1.400	22.920	70.000	181.01	78.8	66.6	103.2	114.4	138.9	0.092	0.124	-0.91	40.21	55.45	55.46	0.292
1.400	23.280	80.000	183.86	79.8	69.5	105.9	114.3	139.5	0.094	0.124	-0.93	41.04	55.07	55.07	0.354
1.400	23.460	85.000	185.28	76.3	70.0	103.6	115.2	138.2	0.092	0.123	-0.92	42.55	56.49	56.49	0.402
1.400	23.640	90.000	186.70	69.7	76.5	103.5	110.2	130.4	0.092	0.116	-0.81	47.68	57.68	57.69	0.384
1.400	23.838	95.500	188.26	58.6	82.2	101.0	106.0	121.1	0.090	0.108	-0.50	54.53	61.07	61.07	0.208
1.400	23.928	98.000	188.97	45.9	71.2	84.7	117.8	126.4	0.075	0.113	-0.29	57.19	68.72	68.72	0.097
1.400	24.000	100.000	189.54	35.0	58.9	68.5	130.6	135.2	0.061	0.120	0.00	59.31	75.01	75.01	0.000

PRESSURES STATIC	TOTAL	RELATIVE	TEMPERATURES STATIC	TOTAL	RELATIVE	MASS FLOW	DEV
15.12	15.26	15.20	290.7	291.4	291.2	0.00	8.25
15.12	15.25	15.21	290.7	291.4	291.2	0.41	9.53
15.12	15.24	15.22	290.7	291.4	291.3	1.03	11.66
15.12	15.23	15.24	290.8	291.4	291.4	2.09	13.13
15.12	15.23	15.24	290.8	291.4	291.5	3.15	14.20
15.12	15.22	15.25	290.9	291.4	291.6	4.21	14.52
15.12	15.22	15.25	290.9	291.4	291.6	6.33	13.11
15.12	15.22	15.26	290.9	291.4	291.7	8.47	11.78
15.12	15.22	15.28	290.9	291.4	291.7	10.68	10.61
15.12	15.22	15.28	290.9	291.4	291.8	12.95	9.85
15.12	15.21	15.29	290.9	291.4	291.8	15.19	10.33
15.12	15.22	15.29	290.9	291.4	291.8	17.43	8.72
15.12	15.21	15.28	290.9	291.4	291.8	18.55	9.64
15.12	15.21	15.27	291.0	291.5	291.8	19.61	9.78
15.12	15.21	15.25	291.1	291.6	291.8	20.64	11.76
15.12	15.18	15.26	291.1	291.4	291.8	21.03	18.72
15.12	15.16	15.28	291.0	291.2	291.9	21.27	23.61

AXIAL DIST	STREAM RADIUS ABSOLUTE	STREAM RADIUS PERCENT	<--- VELOCITIES ---> MERID	VELOCITIES WHIRL	VELOCITIES TOTAL	MACH NUMBERS MERID	MACH NUMBERS TOTAL	AIR ANGLES WHIRL	AIR ANGLES RADIAL	TEMPERATURES STATIC	TEMPERATURES TOTAL	PRESSURES STATIC	PRESSURES TOTAL	INC
2.000	20.400	0.000	81.8	99.0	128.4	0.073	0.115	50.41	-0.00	290.7	291.4	15.12	15.26	-7.66
2.000	20.455	1.524	82.5	95.4	126.1	0.074	0.112	49.16	0.04	290.7	291.4	15.12	15.25	-6.25
2.000	20.549	4.150	83.4	88.9	121.9	0.074	0.109	46.83	0.07	290.7	291.4	15.12	15.24	-3.97
2.000	20.724	8.992	83.9	81.6	117.1	0.075	0.104	44.19	0.05	290.8	291.4	15.12	15.23	0.25
2.000	20.903	13.980	83.2	78.0	114.1	0.074	0.102	43.16	0.02	290.8	291.4	15.12	15.23	4.48
2.000	21.083	18.959	81.9	74.8	111.0	0.073	0.099	42.40	-0.02	290.9	291.4	15.12	15.22	4.90
2.000	21.440	28.900	81.1	73.8	109.6	0.072	0.098	42.31	-0.07	290.9	291.4	15.12	15.22	5.60
2.000	21.801	38.925	81.2	72.2	108.7	0.072	0.097	41.64	-0.13	290.9	291.4	15.12	15.22	5.67
2.000	22.163	48.974	82.8	68.9	107.7	0.074	0.096	39.77	-0.18	290.9	291.4	15.12	15.22	4.35
2.000	22.520	58.896	82.4	68.1	106.9	0.073	0.095	39.55	-0.18	290.9	291.4	15.12	15.22	4.32
2.000	22.874	68.711	78.9	66.7	103.3	0.070	0.092	40.20	-0.15	290.9	291.4	15.12	15.21	4.94
2.000	23.223	78.425	79.6	69.2	105.4	0.071	0.094	40.99	-0.06	290.9	291.4	15.12	15.22	5.66
2.000	23.393	83.145	77.8	69.7	104.5	0.069	0.093	41.86	0.00	290.9	291.4	15.12	15.21	6.38
2.000	23.567	87.973	72.3	73.7	103.2	0.064	0.092	45.56	0.07	291.0	291.5	15.12	15.21	7.89
2.000	23.780	93.886	62.5	81.5	102.7	0.056	0.092	52.55	0.08	291.1	291.6	15.12	15.21	6.91
2.000	23.890	96.932	51.0	77.1	92.4	0.045	0.082	56.48	0.08	291.1	291.5	15.12	15.20	5.80
2.000	24.000	100.000	34.1	58.9	68.1	0.030	0.061	59.96	0.00	291.0	291.2	15.12	15.16	1.06

ACROSS THE STATOR

PRES LOSS COEFF	SPACE CHORD RATIO	DIFFUSION FACTOR	STATIC PRES RISE COEFFS INCOMP	STATIC PRES RISE COEFFS COMP	DE HALLER NUMBER	MERID VELOCITY RATIO	STAGE PRES RATIO	STAGE TEMP RATIO	<-EFFICIENCIES-> STAGE	<-EFFICIENCIES-> ACCUM	STREAM HEIGHT RATIO	LIFT COEFF
0.5364	0.8820	0.7896	0.7686	0.2327	0.4811	0.714	1.0118	0.0040	85.13	85.13	1.401	0.8394
0.4574	0.8850	0.7109	0.6950	0.2382	0.5523	0.808	1.0115	0.0038	87.02	87.02	1.237	0.8221
0.3201	0.8894	0.5999	0.5718	0.2521	0.6544	0.928	1.0113	0.0036	88.39	88.39	1.075	0.8072
0.2187	0.8968	0.5472	0.4852	0.2667	0.7175	0.990	1.0114	0.0038	86.15	86.15	1.008	0.8482
0.1911	0.9043	0.5560	0.4676	0.2766	0.7297	0.998	1.0115	0.0039	83.46	83.46	0.999	0.9106
0.1790	0.9116	0.5672	0.4676	0.2887	0.7297	0.988	1.0114	0.0039	83.48	83.48	1.010	0.9471
0.1686	0.9264	0.5689	0.4576	0.2890	0.7365	0.996	1.0115	0.0039	83.35	83.35	1.001	0.9730
0.1516	0.9412	0.5574	0.4385	0.2869	0.7493	1.002	1.0116	0.0039	84.20	84.20	0.995	0.9850
0.1236	0.9561	0.5342	0.4121	0.2884	0.7667	0.997	1.0115	0.0038	86.38	86.38	1.000	0.9871
0.1373	0.9709	0.5459	0.4248	0.2874	0.7585	0.984	1.0114	0.0038	84.70	84.70	1.014	1.0006
0.1362	0.9857	0.5655	0.4426	0.3063	0.7466	0.977	1.0114	0.0038	84.73	84.73	1.020	1.0195
0.1778	1.0005	0.5857	0.4710	0.2933	0.7273	0.963	1.0112	0.0039	81.80	81.80	1.035	1.0183
0.2197	1.0079	0.6190	0.5269	0.3073	0.6878	0.920	1.0110	0.0039	80.89	80.89	1.083	0.9970
0.1782	1.0153	0.6052	0.4892	0.3110	0.7147	1.014	1.0112	0.0040	80.42	80.42	0.982	0.9995
0.1699	1.0234	0.6639	0.5141	0.3441	0.6971	1.137	1.0115	0.0044	73.97	73.97	0.876	1.0142
0.0777	1.0271	0.6355	0.4475	0.3696	0.7433	1.335	1.0118	0.0042	80.14	80.14	0.747	0.9869
-0.5387	1.0300	0.4688	0.1622	0.6996	0.9153	1.813	1.0124	0.0032	108.71	108.71	0.551	0.9249

AXIAL STATION 11 H03S STATOR EXIT STN 11 HP STATOR NO 1

AXIAL DIST	MESH RADIUS ABSOLUTE	PERCENT	<--- VELOCITIES ---> MERID	WHIRL	TOTAL	TOTAL MACH NO	<--- AIR ANGLES ---> RADIAL	WHIRL	AXIAL WHIRL	TEMPERATURE STATIC	TOTAL	PRESSURES STATIC	TOTAL	MASS FLOW	1/RAD CURV	DEV
4.300	20.400	0.000	58.4	20.2	61.8	0.055	0.00	19.04	19.04	291.3	291.4	15.15	15.18	0.00	0.000	34.09
4.300	20.472	2.000	66.6	20.3	69.6	0.062	0.10	16.98	16.98	291.2	291.4	15.15	15.19	0.31	-0.060	31.99
4.300	20.580	5.000	77.4	19.1	79.8	0.071	0.22	13.88	13.88	291.1	291.4	15.15	15.20	0.86	-0.099	28.84
4.300	20.760	10.000	83.1	12.4	84.0	0.075	0.44	8.49	8.49	291.1	291.4	15.15	15.21	1.89	-0.084	23.36
4.300	20.940	15.000	83.0	5.9	83.2	0.074	0.59	4.05	4.05	291.1	291.4	15.15	15.21	2.95	-0.059	18.84
4.300	21.120	20.000	80.9	2.5	81.0	0.072	0.66	1.76	1.76	291.1	291.4	15.15	15.20	4.01	-0.051	16.50
4.300	21.480	30.000	80.7	1.5	80.7	0.072	0.65	1.03	1.03	291.1	291.4	15.15	15.20	6.11	-0.061	15.72
4.300	21.840	40.000	81.4	1.3	81.4	0.073	0.59	0.92	0.92	291.1	291.4	15.15	15.21	8.26	-0.068	15.61
4.300	22.200	50.000	82.6	1.0	82.6	0.074	0.55	0.72	0.72	291.1	291.4	15.15	15.21	10.48	-0.067	15.54
4.300	22.560	60.000	81.1	1.0	81.1	0.072	0.52	0.70	0.70	291.1	291.4	15.15	15.20	12.73	-0.086	15.87
4.300	22.920	70.000	77.1	1.2	77.1	0.069	0.45	0.88	0.88	291.1	291.4	15.15	15.20	14.93	-0.129	16.56
4.300	23.280	80.000	76.6	3.1	76.7	0.068	0.38	2.31	2.31	291.2	291.4	15.15	15.20	17.11	-0.188	18.67
4.300	23.460	85.000	71.6	6.0	71.9	0.064	0.37	4.79	4.79	291.2	291.4	15.15	15.19	18.17	-0.236	21.54
4.300	23.640	90.000	73.3	8.5	73.8	0.066	0.35	6.64	6.64	291.2	291.5	15.15	15.20	19.21	-0.267	23.76
4.300	23.838	95.500	71.0	9.0	71.6	0.064	0.27	7.19	7.19	291.3	291.6	15.15	15.20	20.37	-0.215	24.77
4.300	23.928	98.000	68.1	8.8	68.7	0.061	0.16	7.37	7.37	291.3	291.5	15.15	15.19	20.88	-0.145	25.19
4.300	24.000	100.000	61.8	8.2	62.3	0.056	-0.00	7.53	7.53	291.1	291.2	15.15	15.18	21.27	0.000	25.53

7.3 Low-Reaction CD Datum

AXIAL DIST	STREAM ABSOLUTE	RADIUS PERCENT	<--- VELOCITIES ----> MERID	REL WHIRL	REL TOTAL	MACH NUMBERS MERID	REL TOTAL	AIR REL WHIRL	ANGLES RADIAL	<-- TEMPERATURES ---> STATIC	TOTAL	RELATIVE	<---- PRESSURES ----> STATIC	TOTAL	RELATIVE	INC
0.000	20.400	0.000	68.1	98.6	119.8	0.061	0.107	55.39	0.00	290.0	290.3	290.6	14.91	14.97	15.03	-0.63
0.003	20.493	2.587	80.5	101.1	129.2	0.072	0.115	51.49	-0.14	289.9	290.3	290.7	14.91	14.99	15.05	-4.39
0.007	20.617	6.018	96.5	106.9	144.0	0.086	0.129	47.92	-0.25	289.8	290.3	290.7	14.91	15.01	15.09	-7.77
0.014	20.797	11.022	115.8	111.8	161.0	0.103	0.144	43.99	-0.28	289.6	290.3	290.8	14.91	15.04	15.13	-11.41
0.019	20.964	15.679	119.0	114.8	165.4	0.106	0.148	43.98	-0.23	289.6	290.3	290.8	14.91	15.05	15.14	-11.18
0.025	21.139	20.524	117.1	119.3	167.2	0.105	0.149	45.53	-0.21	289.6	290.3	290.9	14.92	15.04	15.15	-9.46
0.038	21.502	30.605	120.9	119.5	170.0	0.108	0.152	44.65	-0.26	289.5	290.3	290.9	14.92	15.05	15.16	-10.08
0.050	21.864	40.664	119.5	121.1	170.1	0.107	0.152	45.38	-0.31	289.6	290.3	290.9	14.92	15.05	15.16	-9.12
0.062	22.229	50.796	118.8	124.5	172.1	0.106	0.154	46.34	-0.39	289.6	290.3	290.9	14.92	15.05	15.17	-8.26
0.075	22.593	60.924	117.4	127.5	173.3	0.105	0.155	47.35	-0.45	289.6	290.3	291.0	14.92	15.05	15.17	-7.59
0.087	22.953	70.908	117.6	128.6	174.3	0.105	0.156	47.56	-0.46	289.6	290.3	291.0	14.92	15.05	15.17	-7.81
0.099	23.309	80.805	111.8	130.4	171.8	0.100	0.153	49.40	-0.42	289.6	290.3	291.0	14.92	15.04	15.17	-6.72
0.106	23.489	85.804	107.1	133.5	171.2	0.096	0.153	51.26	-0.39	289.7	290.3	291.0	14.92	15.03	15.17	-5.42
0.112	23.668	90.789	100.2	138.1	170.7	0.090	0.152	54.04	-0.34	289.8	290.3	291.1	14.92	15.02	15.17	-3.31
0.118	23.856	96.000	96.0	142.6	171.9	0.086	0.154	56.07	-0.20	289.8	290.3	291.2	14.92	15.01	15.17	-2.03
0.121	23.937	98.251	94.1	144.8	172.7	0.084	0.154	57.00	-0.10	289.8	290.3	291.2	14.92	15.01	15.17	-1.41
0.123	24.000	100.000	92.5	146.4	173.2	0.083	0.155	57.71	-0.00	289.9	290.3	291.2	14.92	15.00	15.17	-0.94

ACROSS THE ROTOR

PRES LOSS COEFF	SPACE CHORD RATIO	DIFFUSION FACTOR	STATIC PRES RISE COEFFS INCOMP	COMP	DE HALLER NUMBER	MERID VELOCITY RATIO	WORK FUNCTIONS DH/U2*U2	FLOW FUNCTIONS VAM/U	ROTOR PRES RATIO	ROTOR TEMP RATIO	BLADE EFF	STREAM HEIGHT RATIO	LIFT COEFF
-0.2864	0.7156	0.4601	0.3743	0.6586	0.7910	1.3762	0.5555	0.4495	1.0166	0.0041	116.13	0.723	0.6736
-0.1684	0.7184	0.4648	0.4080	0.5719	0.7694	1.2184	0.5547	0.5289	1.0159	0.0041	110.97	0.818	0.6774
-0.0177	0.7227	0.4770	0.4527	0.4652	0.7398	1.0842	0.5662	0.6306	1.0150	0.0042	101.39	0.920	0.6671
0.1259	0.7299	0.4835	0.5084	0.3788	0.7012	0.9397	0.5292	0.7503	1.0122	0.0040	87.04	1.062	0.6118
0.1309	0.7371	0.4652	0.4961	0.3628	0.7099	0.9388	0.5055	0.7647	1.0117	0.0039	85.39	1.063	0.5873
0.0935	0.7440	0.4402	0.4566	0.3610	0.7372	0.9971	0.5088	0.7465	1.0125	0.0040	89.58	1.000	0.5866
0.0711	0.7572	0.4215	0.4332	0.3595	0.7529	1.0027	0.4913	0.7578	1.0128	0.0040	91.80	0.994	0.5829
0.0599	0.7706	0.4160	0.4305	0.3678	0.7546	1.0047	0.4648	0.7361	1.0127	0.0039	92.93	0.992	0.5719
0.0549	0.7839	0.4105	0.4248	0.3666	0.7584	1.0147	0.4504	0.7201	1.0128	0.0039	93.38	0.983	0.5656
0.0673	0.7980	0.4187	0.4385	0.3676	0.7494	1.0054	0.4361	0.7001	1.0126	0.0039	91.77	0.992	0.5628
0.0832	0.8125	0.4318	0.4556	0.3689	0.7378	0.9862	0.4279	0.6902	1.0125	0.0039	89.83	1.011	0.5699
0.0904	0.8258	0.4570	0.4792	0.3856	0.7216	0.9903	0.4304	0.6460	1.0129	0.0041	89.66	1.007	0.5907
0.1030	0.8318	0.4783	0.4980	0.3918	0.7085	1.0028	0.4418	0.6144	1.0133	0.0043	88.77	0.994	0.6057
0.1413	0.8373	0.5116	0.5421	0.3979	0.6767	0.9777	0.4376	0.5705	1.0128	0.0043	84.78	1.020	0.6045
0.1925	0.8432	0.5460	0.5909	0.3966	0.6396	0.9107	0.4280	0.5419	1.0118	0.0043	78.85	1.095	0.6047
0.2075	0.8460	0.5532	0.6036	0.3953	0.6296	0.8833	0.4201	0.5294	1.0114	0.0042	76.74	1.128	0.6018
0.2171	0.8482	0.5569	0.6118	0.3947	0.6230	0.8597	0.4126	0.5194	1.0110	0.0042	75.22	1.159	0.5996

AXIAL DIST	MESH RADIUS ABSOLUTE	MESH RADIUS PERCENT	BLADE SPEED	VELOCITIES MERID	VELOCITIES WHIRL	VELOCITIES TOTAL	VELOCITIES REL WHIRL	VELOCITIES REL TOTAL	MACH NUMBERS TOTAL	MACH NUMBERS REL TOTAL	AIR ANGLES RADIAL	AIR ANGLES WHIRL	ANGLES REL WHIRL	ANGLES REL AXIAL WHIRL	1/RAD CURV
2.163	20.400	0.000	151.43	93.7	136.9	165.9	14.5	94.8	0.148	0.085	0.00	55.62	8.80	8.80	0.000
2.160	20.472	2.000	151.96	98.0	135.3	167.1	16.6	99.4	0.149	0.089	-0.11	54.08	9.62	9.62	0.087
2.155	20.580	5.000	152.76	104.6	132.7	169.0	20.0	106.5	0.151	0.095	-0.21	51.75	10.84	10.84	0.150
2.147	20.760	10.000	154.10	108.8	124.2	165.1	29.9	112.9	0.147	0.101	-0.23	48.76	15.38	15.38	0.149
2.139	20.940	15.000	155.44	111.7	119.4	163.5	36.0	117.4	0.146	0.105	-0.18	46.91	17.87	17.87	0.096
2.131	21.120	20.000	156.77	116.8	117.4	165.6	39.4	123.3	0.148	0.110	-0.14	45.15	18.63	18.63	0.074
2.115	21.480	30.000	159.44	121.3	118.5	169.6	40.9	128.0	0.151	0.114	-0.16	44.34	18.65	18.65	0.089
2.099	21.840	40.000	162.12	120.0	116.6	167.3	45.5	128.4	0.149	0.115	-0.19	44.18	20.76	20.76	0.099
2.083	22.200	50.000	164.79	120.6	114.8	166.5	50.0	130.5	0.149	0.116	-0.24	43.59	22.53	22.53	0.120
2.067	22.560	60.000	167.46	118.0	113.3	163.6	54.1	129.9	0.146	0.116	-0.29	43.83	24.64	24.64	0.141
2.051	22.920	70.000	170.13	116.0	114.6	163.1	55.5	128.6	0.146	0.115	-0.30	44.66	25.58	25.58	0.139
2.035	23.280	80.000	172.80	110.7	117.0	161.1	55.8	123.9	0.144	0.111	-0.28	46.60	26.74	26.74	0.124
2.027	23.460	85.000	174.14	107.4	117.8	159.4	56.3	121.3	0.142	0.108	-0.28	47.65	27.66	27.66	0.127
2.019	23.640	90.000	175.48	98.0	114.4	150.6	61.1	115.5	0.134	0.103	-0.27	49.41	31.95	31.95	0.129
2.010	23.838	95.500	176.95	87.4	110.2	140.6	66.7	110.0	0.125	0.098	-0.17	51.59	37.37	37.37	0.084
2.006	23.928	98.000	177.61	83.1	107.5	135.9	70.1	108.7	0.121	0.097	-0.08	52.30	40.16	40.16	0.042
2.003	24.000	100.000	178.15	79.5	105.2	131.9	72.9	107.9	0.118	0.096	0.00	52.91	42.52	42.52	0.000

PRESSURES STATIC	PRESSURES TOTAL	PRESSURES RELATIVE	TEMPERATURES STATIC	TEMPERATURES TOTAL	TEMPERATURES RELATIVE	MASS FLOW	DEV
14.99	15.22	15.07	290.2	291.5	290.6	0.00	-0.08
14.99	15.23	15.08	290.2	291.5	290.7	0.48	0.23
14.99	15.23	15.09	290.2	291.5	290.7	1.24	0.70
15.00	15.23	15.10	290.2	291.5	290.8	2.58	3.99
15.00	15.22	15.11	290.2	291.4	290.8	3.98	5.23
15.00	15.23	15.13	290.2	291.5	290.9	5.45	4.66
15.00	15.25	15.14	290.1	291.5	290.9	8.55	1.92
15.01	15.24	15.14	290.1	291.4	290.9	11.73	1.74
15.01	15.24	15.15	290.1	291.4	290.9	14.96	1.63
15.01	15.24	15.15	290.2	291.4	291.0	18.21	2.26
15.01	15.24	15.15	290.2	291.4	291.0	21.46	2.01
15.02	15.24	15.15	290.3	291.5	291.0	24.65	2.00
15.02	15.23	15.14	290.4	291.5	291.0	26.21	2.36
15.02	15.21	15.13	290.5	291.5	291.1	27.69	6.14
15.02	15.19	15.12	290.6	291.5	291.2	29.16	11.04
15.02	15.18	15.12	290.7	291.5	291.2	29.78	13.58
15.02	15.17	15.12	290.7	291.5	291.2	30.25	15.74

AXIAL DIST	STREAM RADIUS ABSOLUTE	STREAM RADIUS PERCENT	VELOCITIES MERID	VELOCITIES WHIRL	VELOCITIES TOTAL	MACH NUMBERS MERID	MACH NUMBERS TOTAL	AIR ANGLES WHIRL	AIR ANGLES RADIAL	TEMPERATURES STATIC	TEMPERATURES TOTAL	PRESSURES STATIC	PRESSURES TOTAL	INC
3.138	20.400	0.000	93.5	136.9	165.8	0.083	0.148	55.68	0.00	290.2	291.5	14.99	15.22	4.38
3.138	20.455	1.542	96.8	135.7	166.7	0.086	0.149	54.49	0.12	290.2	291.5	14.99	15.23	3.34
3.137	20.546	4.064	102.7	133.7	168.6	0.092	0.150	52.46	0.25	290.2	291.5	14.99	15.23	1.56
3.137	20.720	8.887	107.9	125.9	165.8	0.096	0.148	49.39	0.32	290.2	291.5	15.00	15.23	-1.03
3.136	20.911	14.191	111.0	120.0	163.4	0.099	0.146	47.23	0.28	290.2	291.4	15.00	15.22	-2.66
3.135	21.096	19.341	116.1	117.4	165.2	0.104	0.147	45.32	0.26	290.2	291.5	15.00	15.23	-4.07
3.134	21.450	29.178	121.1	118.5	169.4	0.108	0.151	44.36	0.31	290.1	291.5	15.00	15.24	-4.17
3.132	21.807	39.088	120.0	116.8	167.5	0.107	0.149	44.22	0.35	290.1	291.4	15.01	15.24	-3.78
3.131	22.164	49.012	120.6	114.9	166.6	0.108	0.149	43.63	0.37	290.1	291.4	15.01	15.24	-4.17
3.129	22.521	58.909	118.4	113.3	163.9	0.106	0.146	43.75	0.39	290.2	291.4	15.01	15.24	-4.16
3.128	22.882	68.944	116.4	114.4	163.2	0.104	0.146	44.52	0.38	290.2	291.4	15.01	15.24	-4.11
3.126	23.246	79.069	111.3	116.8	161.3	0.099	0.144	46.39	0.33	290.3	291.5	15.02	15.24	-3.40
3.125	23.425	84.035	108.4	117.8	160.1	0.097	0.143	47.38	0.32	290.3	291.5	15.02	15.23	-3.07
3.125	23.604	89.001	100.1	115.2	152.6	0.089	0.136	49.02	0.31	290.5	291.5	15.02	15.22	-2.12
3.124	23.813	94.812	88.7	110.8	141.9	0.079	0.127	51.32	0.20	290.6	291.5	15.02	15.19	-0.65
3.123	23.915	97.636	83.8	107.9	136.6	0.075	0.122	52.18	0.10	290.7	291.5	15.02	15.18	-0.19
3.123	24.000	100.000	79.6	105.2	131.9	0.071	0.118	52.89	0.00	290.7	291.5	15.02	15.17	0.19

ACROSS THE STATOR

PRES LOSS COEFF	SPACE CHORD RATIO	DIFFUSION FACTOR	STATIC PRES RISE COEFFS INCOMP	STATIC PRES RISE COEFFS COMP	DE HALLER NUMBER	MERID VELOCITY RATIO	STAGE PRES RATIO	STAGE TEMP RATIO	EFFICIENCIES STAGE	EFFICIENCIES ACCUM	STREAM HEIGHT RATIO	LIFT COEFF
0.3139	0.7788	0.6755	0.7272	0.4136	0.5223	0.735	1.0117	0.0041	82.38	82.38	1.357	0.6491
0.2834	0.7815	0.6384	0.6882	0.4049	0.5584	0.800	1.0117	0.0041	81.51	81.51	1.245	0.6373
0.2438	0.7855	0.5985	0.6377	0.3940	0.6020	0.873	1.0115	0.0042	78.09	78.09	1.139	0.6407
0.0783	0.7923	0.4768	0.4800	0.4010	0.7211	1.034	1.0115	0.0041	80.64	80.64	0.961	0.6318
0.0128	0.7991	0.4316	0.4218	0.4077	0.7604	1.056	1.0115	0.0039	83.98	83.98	0.941	0.6252
0.0656	0.8056	0.4555	0.4581	0.3917	0.7361	0.992	1.0115	0.0040	81.93	81.93	1.003	0.6359
0.0897	0.8184	0.4514	0.4544	0.3641	0.7386	0.980	1.0114	0.0040	81.49	81.49	1.015	0.6377
0.0714	0.8320	0.4372	0.4362	0.3640	0.7509	0.991	1.0116	0.0039	84.72	84.72	1.004	0.6340
0.0723	0.8456	0.4358	0.4332	0.3602	0.7528	0.984	1.0117	0.0039	85.16	85.16	1.011	0.6398
0.0676	0.8592	0.4393	0.4336	0.3653	0.7526	0.986	1.0116	0.0039	84.45	84.45	1.009	0.6503
0.0508	0.8726	0.4292	0.4147	0.3631	0.7651	1.012	1.0117	0.0039	84.61	84.61	0.983	0.6543
0.0942	0.8868	0.4700	0.4585	0.3638	0.7358	0.999	1.0115	0.0041	80.18	80.18	0.997	0.6821
0.1262	0.8938	0.4973	0.4892	0.3627	0.7147	0.983	1.0115	0.0042	76.78	76.78	1.013	0.6968
0.0973	0.9004	0.5124	0.4966	0.3988	0.7095	1.006	1.0117	0.0043	77.49	77.49	0.989	0.7144
0.0023	0.9076	0.4992	0.4576	0.4543	0.7365	1.102	1.0119	0.0043	79.39	79.39	0.903	0.7293
-0.0550	0.9109	0.4892	0.4329	0.4866	0.7531	1.154	1.0120	0.0042	80.89	80.89	0.863	0.7357
-0.1113	0.9136	0.4775	0.4081	0.5180	0.7694	1.202	1.0121	0.0042	82.59	82.59	0.829	0.7382

AXIAL STATION 11 H03S STATOR EXIT STN 11 HP STATOR NO 1

AXIAL DIST	MESH RADIUS ABSOLUTE	PERCENT	<--- VELOCITIES ---> MERID	WHIRL	TOTAL	TOTAL MACH NO	<--- AIR ANGLES ---> RADIAL	WHIRL	AXIAL WHIRL	TEMPERATURE STATIC	TOTAL	PRESSURES STATIC	TOTAL	MASS FLOW	1/RAD CURV	DEV
5.188	20.400	0.000	68.7	52.7	86.6	0.077	0.00	37.52	37.52	291.1	291.5	15.09	15.15	0.00	0.000	22.77
5.188	20.472	2.000	77.4	51.7	93.1	0.083	0.10	33.71	33.71	291.1	291.5	15.09	15.16	0.36	-0.075	18.85
5.188	20.580	5.000	89.7	47.5	101.5	0.090	0.21	27.89	27.89	291.0	291.5	15.09	15.18	0.99	-0.149	12.87
5.188	20.760	10.000	111.6	42.9	119.6	0.107	0.34	21.02	21.02	290.8	291.5	15.09	15.21	2.27	-0.159	5.72
5.189	20.940	15.000	117.2	41.3	124.3	0.111	0.37	19.41	19.41	290.7	291.4	15.09	15.22	3.75	-0.090	3.82
5.189	21.120	20.000	115.2	38.8	121.6	0.108	0.40	18.60	18.61	290.8	291.5	15.09	15.21	5.24	-0.054	2.82
5.189	21.480	30.000	118.7	39.7	125.2	0.112	0.48	18.48	18.48	290.7	291.5	15.09	15.22	8.28	-0.070	2.45
5.190	21.840	40.000	118.9	41.0	125.8	0.112	0.53	19.02	19.02	290.7	291.4	15.09	15.23	11.43	-0.077	2.82
5.190	22.200	50.000	118.7	40.5	125.4	0.112	0.57	18.84	18.84	290.7	291.4	15.09	15.23	14.63	-0.085	2.64
5.191	22.560	60.000	116.7	40.0	123.4	0.110	0.59	18.92	18.92	290.7	291.4	15.09	15.22	17.85	-0.101	2.72
5.191	22.920	70.000	117.7	41.7	124.8	0.111	0.58	19.49	19.49	290.7	291.4	15.10	15.23	21.11	-0.097	3.49
5.192	23.280	80.000	111.1	41.8	118.7	0.106	0.52	20.62	20.62	290.8	291.5	15.10	15.21	24.36	-0.083	5.11
5.192	23.460	85.000	106.5	41.8	114.4	0.102	0.48	21.41	21.41	290.9	291.5	15.10	15.21	25.91	-0.098	6.18
5.192	23.640	90.000	100.6	39.9	108.3	0.096	0.41	21.61	21.61	291.0	291.5	15.10	15.20	27.40	-0.118	6.66
5.193	23.838	95.500	97.8	37.0	104.5	0.093	0.24	20.73	20.73	291.0	291.5	15.10	15.19	28.98	-0.090	6.07
5.193	23.928	98.000	96.7	35.2	102.9	0.092	0.12	20.02	20.02	291.0	291.5	15.10	15.19	29.69	-0.049	5.50
5.193	24.000	100.000	95.7	33.9	101.5	0.090	0.00	19.52	19.52	291.0	291.5	15.10	15.18	30.25	-0.000	5.11

AXIAL DIST	STREAM ABSOLUTE	RADIUS PERCENT	<--- VELOCITIES ----> MERID	REL WHIRL	REL TOTAL	MACH NUMBERS MERID	REL TOTAL	AIR REL WHIRL	ANGLES RADIAL	<-- TEMPERATURES ---> STATIC	TOTAL	RELATIVE	<---- PRESSURES ----> STATIC	TOTAL	RELATIVE	INC
0.000	20.400	0.000	66.2	110.3	128.6	0.059	0.115	59.01	0.00	290.0	290.3	290.8	14.98	15.03	15.12	3.00
0.003	20.492	2.543	72.3	112.9	134.1	0.065	0.120	57.35	-0.14	290.0	290.3	290.8	14.98	15.04	15.13	1.47
0.007	20.619	6.097	80.4	117.3	142.3	0.072	0.127	55.58	-0.28	289.9	290.3	290.9	14.98	15.04	15.15	-0.11
0.014	20.815	11.525	92.2	121.3	152.4	0.082	0.136	52.75	-0.41	289.9	290.3	290.9	14.98	15.06	15.18	-2.63
0.020	20.993	16.482	101.7	122.2	159.0	0.091	0.142	50.23	-0.43	289.8	290.3	290.9	14.98	15.08	15.19	-4.90
0.026	21.167	21.317	105.1	123.5	162.2	0.094	0.145	49.61	-0.43	289.7	290.3	291.0	14.98	15.08	15.20	-5.35
0.038	21.524	31.223	108.8	123.6	164.7	0.097	0.147	48.64	-0.45	289.7	290.3	290.9	14.98	15.09	15.21	-6.07
0.051	21.885	41.261	108.2	125.0	165.3	0.097	0.148	49.12	-0.50	289.7	290.3	291.0	14.98	15.09	15.21	-5.38
0.063	22.247	51.303	108.3	127.0	167.0	0.097	0.149	49.55	-0.56	289.7	290.3	291.0	14.99	15.10	15.22	-5.06
0.075	22.606	61.265	107.7	128.8	167.9	0.096	0.150	50.10	-0.58	289.7	290.3	291.0	14.99	15.10	15.22	-4.85
0.088	22.962	71.161	105.3	131.0	168.0	0.094	0.150	51.21	-0.57	289.7	290.3	291.0	14.99	15.09	15.23	-4.18
0.100	23.320	81.101	98.3	135.5	167.4	0.088	0.150	54.03	-0.52	289.8	290.3	291.1	14.99	15.08	15.23	-2.12
0.106	23.501	86.145	94.2	138.9	167.9	0.084	0.150	55.85	-0.50	289.8	290.3	291.1	14.99	15.07	15.23	-0.87
0.112	23.676	91.006	92.3	142.6	169.8	0.082	0.152	57.07	-0.41	289.9	290.3	291.2	14.99	15.07	15.23	-0.31
0.118	23.858	96.046	89.4	146.7	171.8	0.080	0.153	58.64	-0.22	289.9	290.3	291.3	14.99	15.07	15.24	0.54
0.121	23.937	98.261	88.1	148.4	172.6	0.079	0.154	59.31	-0.10	289.9	290.3	291.3	14.99	15.06	15.24	0.90
0.123	24.000	100.000	87.1	149.8	173.2	0.078	0.155	59.82	-0.00	289.9	290.3	291.3	14.99	15.06	15.24	1.18

ACROSS THE ROTOR

PRES LOSS COEFF	SPACE CHORD RATIO	DIFFUSION FACTOR	STATIC RISE INCOMP	PRES COEFFS COMP	DE HALLER NUMBER	MERID VELOCITY RATIO	WORK FUNCTIONS DH/U2*U2	FLOW VAM/U	ROTOR PRES RATIO	ROTOR TEMP RATIO	BLADE EFF	STREAM HEIGHT RATIO	LIFT COEFF
-0.1103	0.7156	0.6094	0.5417	0.6507	0.6770	1.3103	0.6798	0.4373	1.0185	0.0050	105.85	0.760	0.6947
-0.0549	0.7184	0.6054	0.5542	0.6056	0.6677	1.2286	0.6710	0.4756	1.0179	0.0049	103.19	0.811	0.6958
0.0191	0.7227	0.6004	0.5696	0.5451	0.6561	1.1435	0.6616	0.5254	1.0171	0.0049	98.75	0.872	0.6892
0.0971	0.7299	0.5876	0.5873	0.4842	0.6424	1.0272	0.6241	0.5969	1.0154	0.0047	92.41	0.972	0.6692
0.1293	0.7371	0.5690	0.5844	0.4497	0.6447	0.9653	0.5937	0.6527	1.0142	0.0046	88.63	1.034	0.6553
0.1167	0.7440	0.5417	0.5579	0.4365	0.6649	0.9772	0.5753	0.6688	1.0141	0.0045	89.17	1.021	0.6436
0.0789	0.7572	0.5042	0.5160	0.4324	0.6957	0.9991	0.5458	0.6810	1.0144	0.0044	92.31	0.999	0.6337
0.0655	0.7706	0.4947	0.5081	0.4378	0.7013	1.0045	0.5193	0.6659	1.0143	0.0044	93.47	0.993	0.6246
0.0679	0.7839	0.4918	0.5090	0.4361	0.7007	0.9986	0.4980	0.6560	1.0141	0.0043	93.02	0.999	0.6171
0.0737	0.7980	0.4968	0.5162	0.4376	0.6956	0.9913	0.4839	0.6417	1.0140	0.0043	92.37	1.006	0.6181
0.0881	0.8125	0.5162	0.5364	0.4438	0.6809	0.9820	0.4794	0.6176	1.0142	0.0044	91.07	1.016	0.6291
0.0965	0.8258	0.5402	0.5562	0.4554	0.6661	1.0066	0.4846	0.5680	1.0147	0.0046	90.69	0.990	0.6399
0.1204	0.8318	0.5619	0.5818	0.4571	0.6466	0.9974	0.4839	0.5402	1.0145	0.0047	88.47	1.000	0.6396
0.1719	0.8373	0.5978	0.6260	0.4504	0.6116	0.9389	0.4845	0.5254	1.0139	0.0048	83.42	1.062	0.6467
0.2149	0.8432	0.6307	0.6621	0.4453	0.5813	0.8917	0.4883	0.5049	1.0136	0.0049	79.31	1.118	0.6572
0.2273	0.8460	0.6393	0.6723	0.4441	0.5724	0.8738	0.4866	0.4959	1.0134	0.0049	78.01	1.140	0.6598
0.2368	0.8482	0.6459	0.6801	0.4432	0.5656	0.8583	0.4849	0.4888	1.0133	0.0049	76.99	1.160	0.6624

AXIAL DIST	MESH ABSOLUTE	RADIUS PERCENT	BLADE SPEED	VELOCITIES MERID	VELOCITIES WHIRL	VELOCITIES TOTAL	VELOCITIES REL WHIRL	VELOCITIES REL TOTAL	MACH NUMBERS TOTAL	MACH NUMBERS REL TOTAL	AIR ANGLES RADIAL	AIR ANGLES WHIRL	ANGLES REL WHIRL	ANGLES REL AXIAL WHIRL	1/RAD CURV
2.163	20.400	0.000	151.43	86.8	144.1	168.2	7.3	87.1	0.150	0.078	0.00	58.95	4.83	4.83	0.000
2.160	20.472	2.000	151.96	88.9	141.2	166.9	10.7	89.5	0.149	0.080	-0.12	57.82	6.90	6.90	0.078
2.155	20.580	5.000	152.76	92.0	136.8	164.9	15.9	93.3	0.147	0.083	-0.25	56.10	9.82	9.82	0.157
2.147	20.760	10.000	154.10	94.7	129.5	160.4	24.6	97.9	0.143	0.087	-0.37	53.81	14.57	14.57	0.217
2.139	20.940	15.000	155.44	98.2	126.0	159.7	29.4	102.5	0.142	0.091	-0.40	52.07	16.69	16.69	0.207
2.131	21.120	20.000	156.77	102.7	123.8	160.9	32.9	107.8	0.144	0.096	-0.39	50.33	17.78	17.78	0.180
2.115	21.480	30.000	159.44	108.7	123.3	164.4	36.2	114.6	0.147	0.102	-0.39	48.60	18.40	18.40	0.166
2.099	21.840	40.000	162.12	108.7	121.7	163.2	40.4	115.9	0.146	0.103	-0.43	48.25	20.38	20.38	0.173
2.083	22.200	50.000	164.79	108.2	120.2	161.7	44.5	117.0	0.144	0.104	-0.46	48.03	22.38	22.38	0.181
2.067	22.560	60.000	167.46	106.7	120.1	160.7	47.4	116.8	0.143	0.104	-0.47	48.37	23.93	23.93	0.178
2.051	22.920	70.000	170.13	103.4	121.1	159.2	49.0	114.4	0.142	0.102	-0.45	49.52	25.36	25.36	0.165
2.035	23.280	80.000	172.80	99.0	121.4	156.7	51.4	111.5	0.140	0.099	-0.43	50.82	27.43	27.43	0.162
2.027	23.460	85.000	174.14	94.0	119.8	152.3	54.3	108.6	0.136	0.097	-0.43	51.89	30.01	30.01	0.175
2.019	23.640	90.000	175.48	86.7	118.2	146.6	57.2	103.9	0.131	0.093	-0.37	53.75	33.43	33.43	0.158
2.010	23.838	95.500	176.95	79.7	116.8	141.4	60.2	99.9	0.126	0.089	-0.20	55.68	37.03	37.03	0.087
2.006	23.928	98.000	177.61	77.0	115.7	139.0	61.9	98.8	0.124	0.088	-0.10	56.36	38.81	38.81	0.042
2.003	24.000	100.000	178.15	74.7	114.8	137.0	63.4	98.0	0.122	0.087	0.00	56.93	40.29	40.29	0.000

PRESSURES STATIC	PRESSURES TOTAL	PRESSURES RELATIVE	TEMPERATURES STATIC	TEMPERATURES TOTAL	TEMPERATURES RELATIVE	MASS FLOW	DEV
15.07	15.31	15.13	290.4	291.7	290.8	0.00	-4.06
15.07	15.31	15.14	290.4	291.7	290.8	0.44	-2.49
15.07	15.30	15.15	290.5	291.7	290.9	1.12	-0.32
15.07	15.29	15.16	290.5	291.7	290.9	2.30	3.18
15.08	15.29	15.17	290.4	291.6	290.9	3.53	4.06
15.08	15.30	15.18	290.4	291.6	290.9	4.82	3.80
15.08	15.31	15.19	290.3	291.6	290.9	7.58	1.68
15.08	15.31	15.20	290.3	291.6	291.0	10.47	1.37
15.09	15.31	15.20	290.3	291.6	291.0	13.39	1.48
15.09	15.31	15.21	290.4	291.6	291.0	16.34	1.55
15.09	15.31	15.20	290.4	291.6	291.0	19.26	1.79
15.10	15.30	15.20	290.5	291.6	291.1	22.13	2.69
15.10	15.29	15.20	290.6	291.7	291.1	23.51	4.71
15.10	15.28	15.19	290.7	291.7	291.2	24.81	7.63
15.10	15.27	15.19	290.8	291.7	291.3	26.14	10.69
15.10	15.27	15.18	290.8	291.7	291.3	26.71	12.22
15.10	15.26	15.18	290.9	291.7	291.3	27.16	13.51

AXIAL DIST	STREAM RADIUS ABSOLUTE	STREAM RADIUS PERCENT	<--- VELOCITIES ---> MERID	WHIRL	TOTAL	MACH NUMBERS MERID	MACH NUMBERS TOTAL	AIR ANGLES WHIRL	AIR ANGLES RADIAL	TEMPERATURES STATIC	TEMPERATURES TOTAL	PRESSURES STATIC	PRESSURES TOTAL	INC
3.138	20.400	0.000	86.5	144.1	168.1	0.077	0.150	59.01	0.00	290.4	291.7	15.07	15.31	7.71
3.138	20.455	1.541	88.2	141.9	167.1	0.079	0.149	58.14	0.13	290.4	291.7	15.07	15.31	6.99
3.137	20.542	3.955	90.8	138.4	165.5	0.081	0.148	56.72	0.29	290.5	291.7	15.07	15.30	5.81
3.137	20.700	8.329	93.7	131.6	161.6	0.084	0.144	54.55	0.48	290.5	291.7	15.07	15.29	4.08
3.136	20.876	13.224	96.8	127.0	159.7	0.086	0.142	52.69	0.53	290.5	291.6	15.08	15.29	2.71
3.135	21.062	18.401	101.3	124.3	160.3	0.090	0.143	50.82	0.51	290.4	291.6	15.08	15.29	1.34
3.134	21.432	28.673	108.6	123.4	164.3	0.097	0.147	48.65	0.45	290.3	291.6	15.08	15.31	0.08
3.132	21.796	38.778	108.8	121.9	163.4	0.097	0.146	48.27	0.41	290.3	291.6	15.08	15.31	0.25
3.131	22.156	48.787	108.3	120.3	161.9	0.097	0.144	48.01	0.40	290.3	291.6	15.09	15.31	0.20
3.129	22.516	58.783	107.0	120.1	160.8	0.095	0.144	48.30	0.39	290.4	291.6	15.09	15.31	0.39
3.128	22.878	68.841	103.8	121.0	159.4	0.093	0.142	49.39	0.37	290.4	291.6	15.09	15.31	0.77
3.126	23.240	78.880	99.6	121.4	157.0	0.089	0.140	50.63	0.36	290.5	291.6	15.10	15.30	0.86
3.125	23.416	83.787	95.3	120.3	153.5	0.085	0.137	51.60	0.36	290.6	291.7	15.10	15.30	1.19
3.125	23.599	88.859	88.2	118.6	147.8	0.079	0.132	53.35	0.33	290.7	291.7	15.10	15.28	2.23
3.124	23.814	94.839	80.4	117.0	142.0	0.072	0.127	55.51	0.19	290.8	291.7	15.10	15.27	3.53
3.123	23.916	97.673	77.2	115.8	139.2	0.069	0.124	56.32	0.09	290.8	291.7	15.10	15.27	3.94
3.123	24.000	100.000	74.6	114.8	136.9	0.066	0.122	56.98	0.00	290.9	291.7	15.10	15.26	4.28

ACROSS THE STATOR

PRES LOSS COEFF	SPACE CHORD RATIO	DIFFUSION FACTOR	STATIC PRES RISE COEFFS INCOMP	STATIC PRES RISE COEFFS COMP	DE HALLER NUMBER	MERID VELOCITY RATIO	STAGE PRES RATIO	STAGE TEMP RATIO	<-EFFICIENCIES-> STAGE	<-EFFICIENCIES-> ACCUM	STREAM HEIGHT RATIO	LIFT COEFF
0.3437	0.7788	0.7809	0.7904	0.4469	0.4578	0.752	1.0131	0.0050	74.81	74.81	1.325	0.7030
0.3251	0.7815	0.7645	0.7741	0.4492	0.4753	0.782	1.0130	0.0049	74.68	74.68	1.273	0.7032
0.2960	0.7855	0.7432	0.7504	0.4544	0.4996	0.820	1.0129	0.0049	74.20	74.20	1.212	0.7097
0.2079	0.7923	0.6698	0.6730	0.4649	0.5719	0.922	1.0128	0.0048	76.05	76.05	1.077	0.7102
0.1007	0.7991	0.5817	0.5771	0.4758	0.6503	1.014	1.0131	0.0046	80.94	80.94	0.979	0.6963
0.0630	0.8056	0.5367	0.5285	0.4647	0.6866	1.030	1.0132	0.0045	83.06	83.06	0.964	0.6884
0.0680	0.8184	0.5083	0.5035	0.4347	0.7046	1.009	1.0133	0.0044	85.56	85.56	0.985	0.6787
0.0754	0.8320	0.5099	0.5045	0.4284	0.7039	0.999	1.0132	0.0044	86.04	86.04	0.995	0.6858
0.0769	0.8456	0.5120	0.5048	0.4271	0.7037	0.993	1.0130	0.0043	85.69	85.69	1.001	0.6947
0.0777	0.8592	0.5101	0.5028	0.4243	0.7052	0.994	1.0129	0.0043	85.09	85.09	1.000	0.6947
0.0804	0.8726	0.5142	0.5035	0.4224	0.7046	1.008	1.0130	0.0044	83.86	83.86	0.986	0.7001
0.1251	0.8868	0.5607	0.5497	0.4241	0.6711	0.982	1.0129	0.0046	80.14	80.14	1.013	0.7302
0.1307	0.8938	0.5876	0.5718	0.4407	0.6544	0.979	1.0129	0.0047	78.81	78.81	1.016	0.7504
0.0863	0.9004	0.5893	0.5564	0.4695	0.6660	1.045	1.0130	0.0047	78.20	78.20	0.952	0.7644
0.0492	0.9076	0.6017	0.5506	0.5007	0.6704	1.116	1.0131	0.0049	76.49	76.49	0.892	0.7776
0.0303	0.9109	0.6053	0.5475	0.5163	0.6727	1.145	1.0131	0.0049	76.27	76.27	0.869	0.7806
0.0132	0.9136	0.6075	0.5437	0.5296	0.6755	1.173	1.0131	0.0049	76.20	76.20	0.849	0.7821

AXIAL STATION 11 H03S STATOR EXIT STN 11 HP STATOR NO 1

AXIAL DIST	MESH RADIUS ABSOLUTE	MESH RADIUS PERCENT	<--- VELOCITIES ---> MERID	WHIRL	TOTAL	TOTAL MACH NO	<--- AIR ANGLES ---> RADIAL	WHIRL	AXIAL WHIRL	TEMPERATURE STATIC	TEMPERATURE TOTAL	PRESSURES STATIC	PRESSURES TOTAL	MASS FLOW	1/RAD CURV	DEV
5.188	20.400	0.000	65.1	41.1	77.0	0.069	0.00	32.25	32.25	291.5	291.7	15.18	15.23	0.00	0.000	17.50
5.188	20.472	2.000	69.0	39.3	79.4	0.071	0.14	29.67	29.67	291.4	291.7	15.18	15.23	0.34	-0.066	14.81
5.188	20.580	5.000	74.5	35.9	82.7	0.074	0.32	25.71	25.71	291.4	291.7	15.18	15.24	0.88	-0.148	10.69
5.188	20.760	10.000	86.4	32.8	92.4	0.082	0.58	20.80	20.80	291.3	291.7	15.18	15.25	1.90	-0.225	5.49
5.189	20.940	15.000	98.1	34.1	103.8	0.093	0.71	19.15	19.15	291.1	291.6	15.18	15.27	3.08	-0.219	3.56
5.189	21.120	20.000	104.3	35.2	110.1	0.098	0.74	18.62	18.63	291.1	291.6	15.18	15.28	4.39	-0.177	2.84
5.189	21.480	30.000	109.5	37.7	115.8	0.103	0.76	18.98	18.98	291.0	291.6	15.18	15.29	7.21	-0.117	2.94
5.190	21.840	40.000	108.6	37.8	115.0	0.103	0.75	19.18	19.19	291.0	291.6	15.18	15.29	10.11	-0.097	2.99
5.190	22.200	50.000	107.6	37.6	113.9	0.102	0.73	19.25	19.25	291.0	291.6	15.18	15.29	13.04	-0.098	3.05
5.191	22.560	60.000	106.4	39.3	113.4	0.101	0.70	20.29	20.29	291.0	291.6	15.18	15.29	15.98	-0.104	4.09
5.191	22.920	70.000	104.6	40.9	112.3	0.100	0.66	21.36	21.36	291.0	291.6	15.18	15.29	18.93	-0.101	5.36
5.192	23.280	80.000	97.8	39.2	105.4	0.094	0.57	21.83	21.84	291.1	291.6	15.18	15.28	21.82	-0.110	6.32
5.192	23.460	85.000	93.4	37.0	100.4	0.089	0.53	21.63	21.63	291.2	291.7	15.19	15.27	23.19	-0.138	6.40
5.192	23.640	90.000	92.2	34.6	98.4	0.088	0.43	20.58	20.58	291.2	291.7	15.19	15.27	24.53	-0.143	5.62
5.193	23.838	95.500	89.7	31.8	95.2	0.085	0.23	19.54	19.54	291.3	291.7	15.19	15.26	25.99	-0.087	4.88
5.193	23.928	98.000	88.4	30.8	93.7	0.083	0.11	19.21	19.21	291.3	291.7	15.19	15.26	26.64	-0.044	4.69
5.193	24.000	100.000	87.5	30.0	92.5	0.082	0.00	18.93	18.93	291.3	291.7	15.19	15.26	27.16	-0.000	4.51

7.4 Low-Reaction CD with Inviscid End-Bends

AXIAL DIST	STREAM ABSOLUTE	RADIUS PERCENT	<--- VELOCITIES ----> MERID	REL WHIRL	REL TOTAL	MACH NUMBERS MERID	REL TOTAL	AIR REL WHIRL	ANGLES RADIAL	<-- TEMPERATURES ---> STATIC	TOTAL	RELATIVE	<---- PRESSURES ----> STATIC	TOTAL	RELATIVE	INC
0.000	20.400	0.000	65.3	73.4	98.2	0.058	0.088	48.32	0.00	289.9	290.4	290.4	14.93	15.02	15.01	-13.91
0.002	20.469	1.905	73.9	73.0	103.8	0.066	0.093	44.66	-0.01	289.9	290.4	290.4	14.93	15.03	15.02	-17.02
0.006	20.570	4.722	86.7	74.3	114.1	0.077	0.102	40.59	-0.01	289.8	290.4	290.4	14.93	15.05	15.04	-20.26
0.012	20.738	9.391	103.5	81.0	131.4	0.092	0.117	38.07	0.02	289.7	290.4	290.5	14.93	15.07	15.08	-21.33
0.017	20.909	14.133	114.5	87.8	144.3	0.102	0.129	37.48	0.06	289.6	290.4	290.5	14.94	15.08	15.11	-20.47
0.023	21.085	19.031	118.4	99.4	154.6	0.106	0.138	40.01	0.07	289.6	290.4	290.7	14.94	15.08	15.14	-16.76
0.036	21.453	29.253	122.3	115.0	167.8	0.109	0.150	43.24	0.01	289.6	290.4	290.9	14.93	15.08	15.17	-11.96
0.049	21.833	39.799	118.2	121.7	169.7	0.106	0.152	45.82	-0.14	289.7	290.4	291.0	14.93	15.07	15.18	-8.68
0.062	22.219	50.514	117.5	124.4	171.2	0.105	0.153	46.64	-0.34	289.7	290.4	291.0	14.93	15.06	15.18	-7.95
0.075	22.604	61.212	117.5	127.1	173.1	0.105	0.155	47.25	-0.55	289.7	290.4	291.1	14.94	15.07	15.19	-7.69
0.088	22.984	71.766	117.0	126.3	172.2	0.105	0.154	47.20	-0.72	289.7	290.4	291.0	14.94	15.07	15.19	-8.77
0.101	23.358	82.157	111.9	116.9	161.9	0.100	0.145	46.26	-0.81	289.7	290.4	290.9	14.94	15.07	15.16	-12.12
0.107	23.540	87.230	108.0	114.3	157.2	0.096	0.140	46.63	-0.80	289.7	290.4	290.8	14.94	15.07	15.15	-13.91
0.113	23.709	91.919	105.4	113.8	155.1	0.094	0.139	47.22	-0.66	289.7	290.4	290.8	14.94	15.07	15.15	-15.98
0.119	23.875	96.525	101.9	111.0	150.7	0.091	0.135	47.47	-0.35	289.7	290.4	290.8	14.94	15.07	15.13	-18.42
0.121	23.946	98.488	100.4	110.0	149.0	0.090	0.133	47.61	-0.17	289.7	290.4	290.7	14.94	15.07	15.13	-19.35
0.123	24.000	100.000	99.3	109.3	147.7	0.089	0.132	47.73	-0.00	289.7	290.4	290.7	14.94	15.07	15.13	-20.07

ACROSS THE ROTOR

PRES LOSS COEFF	SPACE CHORD RATIO	DIFFUSION FACTOR	STATIC PRES RISE COEFFS INCOMP	COMP	DE HALLER NUMBER	MERID VELOCITY RATIO	WORK FUNCTIONS DH/U2*U2	FLOW VAM/U	ROTOR PRES RATIO	ROTOR TEMP RATIO	BLADE EFF	STREAM HEIGHT RATIO	LIFT COEFF
-0.1495	0.7070	0.6701	0.5387	0.6873	0.6792	0.9549	0.6408	0.4312	1.0173	0.0047	104.92	1.044	0.9565
-0.1169	0.7096	0.6188	0.5137	0.6305	0.6973	0.9442	0.6087	0.4862	1.0165	0.0045	104.49	1.056	0.9291
-0.0474	0.7135	0.5585	0.4909	0.5393	0.7135	0.9282	0.5696	0.5677	1.0152	0.0042	102.33	1.074	0.8589
0.0286	0.7200	0.4810	0.4548	0.4284	0.7384	0.9378	0.5194	0.6722	1.0135	0.0039	97.99	1.062	0.7323
0.0541	0.7265	0.4333	0.4228	0.3715	0.7597	0.9520	0.4930	0.7380	1.0127	0.0038	95.28	1.046	0.6596
0.0563	0.7330	0.3997	0.3944	0.3407	0.7782	0.9944	0.4783	0.7565	1.0124	0.0037	94.29	1.001	0.6062
0.0594	0.7460	0.3708	0.3705	0.3126	0.7934	1.0351	0.4631	0.7678	1.0122	0.0038	92.92	0.962	0.5564
0.0425	0.7590	0.3678	0.3677	0.3249	0.7952	1.0634	0.4494	0.7296	1.0125	0.0038	94.84	0.937	0.5451
0.0344	0.7720	0.3687	0.3684	0.3314	0.7947	1.0703	0.4399	0.7126	1.0128	0.0038	95.79	0.932	0.5446
0.0436	0.7850	0.3727	0.3773	0.3291	0.7891	1.0630	0.4265	0.7002	1.0127	0.0038	94.56	0.939	0.5400
0.0530	0.7980	0.3831	0.3914	0.3321	0.7801	1.0466	0.4145	0.6858	1.0126	0.0038	93.48	0.955	0.5464
0.0129	0.8110	0.3854	0.3940	0.3723	0.7785	1.0311	0.3793	0.6455	1.0125	0.0036	98.51	0.969	0.5533
0.0562	0.8175	0.4409	0.4566	0.3913	0.7371	0.9897	0.3940	0.6180	1.0126	0.0038	94.20	1.010	0.5950
0.1719	0.8240	0.5535	0.5819	0.4024	0.6466	0.8820	0.4298	0.5986	1.0125	0.0042	84.40	1.133	0.6608
0.2257	0.8311	0.6360	0.6632	0.4332	0.5804	0.7985	0.4437	0.5748	1.0127	0.0044	81.57	1.250	0.7101
0.2396	0.8344	0.6645	0.6896	0.4478	0.5572	0.7681	0.4459	0.5650	1.0128	0.0045	81.10	1.299	0.7267
0.2519	0.8370	0.6897	0.7122	0.4603	0.5364	0.7402	0.4479	0.5576	1.0128	0.0045	80.67	1.347	0.7408

AXIAL DIST	MESH RADIUS ABSOLUTE	PERCENT	BLADE SPEED	VELOCITIES MERID	WHIRL	TOTAL	REL WHIRL	REL TOTAL	MACH NUMBERS TOTAL	REL TOTAL	AIR ANGLES RADIAL	WHIRL	REL WHIRL	REL AXIAL WHIRL	1/RAD CURV
2.163	20.400	0.000	151.43	62.4	175.1	185.9	-23.7	66.7	0.166	0.060	0.00	70.40	-20.80	-20.80	0.000
2.160	20.472	2.000	151.96	69.7	171.4	185.1	-19.5	72.4	0.165	0.065	0.05	67.86	-15.60	-15.60	-0.008
2.155	20.580	5.000	152.76	80.5	165.4	183.9	-12.6	81.4	0.164	0.073	0.12	64.06	-8.92	-8.92	-0.029
2.147	20.760	10.000	154.10	97.0	152.9	181.1	1.2	97.0	0.162	0.087	0.22	57.59	0.73	0.73	-0.071
2.139	20.940	15.000	155.44	109.1	143.9	180.6	11.5	109.7	0.161	0.098	0.30	52.85	6.03	6.03	-0.107
2.131	21.120	20.000	156.77	117.7	132.0	176.9	24.8	120.3	0.158	0.107	0.33	48.27	11.88	11.88	-0.123
2.115	21.480	30.000	159.44	126.6	118.1	173.1	41.4	133.2	0.154	0.119	0.28	43.01	18.10	18.11	-0.093
2.099	21.840	40.000	162.12	125.7	113.2	169.2	48.9	134.9	0.151	0.120	0.10	42.00	21.24	21.24	-0.020
2.083	22.200	50.000	164.79	125.8	113.0	169.1	51.8	136.0	0.151	0.121	-0.14	41.93	22.38	22.38	0.079
2.067	22.560	60.000	167.46	124.9	112.2	167.9	55.3	136.6	0.150	0.122	-0.41	41.93	23.88	23.88	0.179
2.051	22.920	70.000	170.13	122.5	114.9	167.9	55.2	134.3	0.150	0.120	-0.63	43.18	24.27	24.27	0.261
2.035	23.280	80.000	172.80	115.4	122.2	168.1	50.6	126.0	0.150	0.112	-0.79	46.63	23.69	23.69	0.328
2.027	23.460	85.000	174.14	106.9	129.3	167.7	44.9	115.9	0.150	0.103	-0.81	50.42	22.78	22.78	0.346
2.019	23.640	90.000	175.48	92.9	137.8	166.2	37.7	100.3	0.148	0.089	-0.71	56.00	22.09	22.09	0.302
2.010	23.838	95.500	176.95	81.3	144.8	166.1	32.1	87.4	0.148	0.078	-0.38	60.68	21.56	21.56	0.163
2.006	23.928	98.000	177.61	77.1	147.0	166.0	30.7	83.0	0.148	0.074	-0.19	62.30	21.68	21.68	0.077
2.003	24.000	100.000	178.15	73.5	148.7	165.9	29.5	79.2	0.148	0.071	0.00	63.68	21.85	21.85	0.000

PRESSURES STATIC	TOTAL	RELATIVE	TEMPERATURES STATIC	TOTAL	RELATIVE	MASS FLOW	DEV
14.99	15.28	15.03	290.2	291.8	290.4	0.00	9.20
14.99	15.28	15.03	290.1	291.7	290.4	0.33	9.08
14.99	15.28	15.05	290.1	291.6	290.4	0.89	7.95
15.00	15.27	15.08	290.0	291.5	290.5	2.01	6.71
15.00	15.27	15.10	290.0	291.5	290.6	3.33	2.82
15.00	15.27	15.12	290.0	291.5	290.7	4.78	2.69
15.01	15.26	15.16	290.1	291.5	290.9	7.98	2.46
15.01	15.25	15.17	290.2	291.5	291.0	11.31	2.20
15.02	15.26	15.17	290.2	291.5	291.0	14.69	1.47
15.02	15.26	15.18	290.2	291.5	291.1	18.11	1.48
15.02	15.26	15.17	290.2	291.5	291.0	21.54	0.86
15.02	15.26	15.16	290.1	291.4	290.9	24.90	0.64
15.02	15.26	15.14	290.2	291.5	290.8	26.49	1.23
15.02	15.26	15.11	290.3	291.6	290.8	27.93	4.65
15.03	15.26	15.09	290.4	291.7	290.8	29.31	11.67
15.03	15.26	15.09	290.4	291.7	290.7	29.89	17.56
15.03	15.26	15.08	290.4	291.7	290.7	30.33	22.85

AXIAL DIST	STREAM RADIUS ABSOLUTE	STREAM RADIUS PERCENT	<--- VELOCITIES ---> MERID	WHIRL	TOTAL	MACH NUMBERS MERID	TOTAL	AIR ANGLES WHIRL	RADIAL	TEMPERATURES STATIC	TOTAL	PRESSURES STATIC	TOTAL	INC
3.138	20.400	0.000	62.0	175.1	185.8	0.055	0.166	70.51	0.00	290.2	291.8	14.99	15.28	-4.30
3.138	20.471	1.985	69.3	171.5	185.0	0.062	0.165	68.00	0.01	290.1	291.7	14.99	15.28	-4.92
3.137	20.581	5.033	80.2	165.4	183.8	0.072	0.164	64.14	0.01	290.1	291.6	14.99	15.28	-5.87
3.136	20.766	10.158	97.1	152.6	180.9	0.087	0.161	57.52	-0.00	290.0	291.5	15.00	15.27	-7.44
3.136	20.952	15.327	109.5	143.3	180.3	0.098	0.161	52.62	-0.04	290.0	291.5	15.00	15.27	-7.34
3.135	21.137	20.461	118.2	131.3	176.6	0.105	0.158	48.00	-0.06	290.0	291.5	15.00	15.27	-7.84
3.133	21.492	30.339	126.6	117.8	173.0	0.113	0.154	42.94	-0.02	290.1	291.5	15.01	15.26	-7.21
3.132	21.836	39.889	125.9	113.2	169.4	0.112	0.151	41.96	0.10	290.2	291.5	15.01	15.25	-5.99
3.131	22.178	49.377	126.1	113.0	169.3	0.112	0.151	41.88	0.25	290.2	291.5	15.02	15.26	-5.92
3.129	22.520	58.881	125.3	112.2	168.2	0.112	0.150	41.84	0.38	290.2	291.5	15.02	15.26	-6.05
3.128	22.863	68.413	123.3	114.2	168.1	0.110	0.150	42.83	0.51	290.2	291.5	15.02	15.26	-6.07
3.126	23.211	78.074	117.4	120.4	168.1	0.105	0.150	45.72	0.58	290.1	291.5	15.02	15.26	-7.25
3.126	23.389	83.030	110.8	126.2	168.0	0.099	0.150	48.73	0.58	290.2	291.5	15.02	15.26	-7.68
3.125	23.574	88.176	97.7	134.8	166.5	0.087	0.149	54.07	0.53	290.3	291.6	15.02	15.26	-7.42
3.124	23.797	94.355	83.2	143.6	165.9	0.074	0.148	59.91	0.32	290.4	291.7	15.03	15.26	-8.60
3.123	23.907	97.414	77.7	146.5	165.8	0.069	0.148	62.04	0.17	290.4	291.7	15.03	15.26	-9.84
3.123	24.000	100.000	73.1	148.7	165.7	0.065	0.148	63.80	0.00	290.4	291.7	15.03	15.26	-10.88

ACROSS THE STATOR

PRES LOSS COEFF	SPACE CHORD RATIO	DIFFUSION FACTOR	STATIC PRES RISE COEFFS INCOMP	COMP	DE HALLER NUMBER	MERID VELOCITY RATIO	STAGE PRES RATIO	STAGE TEMP RATIO	<-EFFICIENCIES-> STAGE	ACCUM	STREAM HEIGHT RATIO	LIFT COEFF
0.3225	0.7788	0.6569	0.7064	0.3843	0.5418	0.979	1.0111	0.0047	67.22	67.22	1.018	0.5598
0.2885	0.7815	0.6188	0.6711	0.3828	0.5735	0.998	1.0109	0.0045	69.58	69.58	0.998	0.5541
0.2360	0.7855	0.5657	0.6166	0.3807	0.6192	1.023	1.0108	0.0042	72.51	72.51	0.973	0.5489
0.1600	0.7923	0.5000	0.5424	0.3821	0.6765	1.018	1.0106	0.0039	76.67	76.67	0.978	0.5535
0.0910	0.7991	0.4386	0.4662	0.3745	0.7306	1.036	1.0111	0.0038	83.24	83.24	0.961	0.5491
0.0593	0.8059	0.4217	0.4400	0.3798	0.7483	1.010	1.0114	0.0037	86.32	86.32	0.987	0.5672
0.0587	0.8193	0.4235	0.4367	0.3770	0.7506	0.963	1.0113	0.0038	85.53	85.53	1.034	0.5970
0.0745	0.8320	0.4424	0.4542	0.3789	0.7388	0.943	1.0113	0.0038	85.81	85.81	1.056	0.6236
0.0744	0.8466	0.4348	0.4437	0.3685	0.7459	0.948	1.0116	0.0038	86.92	86.92	1.049	0.6240
0.0799	0.8592	0.4413	0.4486	0.3680	0.7426	0.944	1.0114	0.0038	85.30	85.30	1.053	0.6356
0.0781	0.8726	0.4396	0.4458	0.3670	0.7444	0.953	1.0113	0.0038	84.44	84.44	1.043	0.6348
0.0705	0.8867	0.4228	0.4364	0.3651	0.7508	0.971	1.0114	0.0036	89.31	89.31	1.023	0.5986
0.0590	0.8939	0.4162	0.4276	0.3677	0.7566	1.006	1.0116	0.0037	89.39	89.39	0.987	0.5868
0.0978	0.9009	0.4603	0.4705	0.3721	0.7277	1.046	1.0110	0.0041	76.86	76.86	0.950	0.6085
0.0840	0.9087	0.4550	0.4536	0.3690	0.7392	1.190	1.0114	0.0044	73.59	73.59	0.836	0.5842
0.0814	0.9122	0.4524	0.4474	0.3653	0.7434	1.257	1.0115	0.0045	73.27	73.27	0.792	0.5697
0.0795	0.9150	0.4493	0.4415	0.3614	0.7473	1.321	1.0116	0.0045	73.06	73.06	0.754	0.5548

AXIAL STATION 11 H03S STATOR EXIT STN 11 HP STATOR NO 1

AXIAL DIST	MESH RADIUS ABSOLUTE	MESH RADIUS PERCENT	VELOCITIES MERID	VELOCITIES WHIRL	VELOCITIES TOTAL	TOTAL MACH NO	AIR ANGLES RADIAL	AIR ANGLES WHIRL	AIR ANGLES AXIAL WHIRL	TEMPERATURE STATIC	TEMPERATURE TOTAL	PRESSURES STATIC	PRESSURES TOTAL	MASS FLOW	1/RAD CURV	DEV
5.188	20.400	0.000	60.7	80.3	100.6	0.090	0.00	52.94	52.94	291.3	291.8	15.10	15.19	0.00	0.000	18.27
5.188	20.472	2.000	69.1	80.5	106.1	0.095	-0.06	49.33	49.33	291.2	291.7	15.10	15.20	0.32	-0.016	16.10
5.188	20.580	5.000	82.0	78.9	113.8	0.101	-0.12	43.87	43.87	291.0	291.6	15.10	15.21	0.89	-0.017	12.82
5.188	20.760	10.000	98.9	72.0	122.4	0.109	-0.13	36.07	36.07	290.8	291.5	15.10	15.23	2.04	0.006	8.81
5.189	20.940	15.000	113.5	67.0	131.8	0.117	-0.11	30.55	30.55	290.7	291.5	15.10	15.25	3.40	0.046	7.07
5.189	21.120	20.000	119.3	56.8	132.2	0.118	-0.09	25.45	25.45	290.7	291.5	15.10	15.25	4.91	0.077	4.65
5.189	21.480	30.000	122.0	44.4	129.8	0.116	0.02	20.00	20.00	290.7	291.5	15.10	15.25	8.07	0.073	2.34
5.190	21.840	40.000	118.7	39.5	125.1	0.112	0.21	18.38	18.38	290.8	291.5	15.10	15.24	11.26	0.020	2.10
5.190	22.200	50.000	119.5	40.7	126.3	0.113	0.43	18.80	18.80	290.8	291.5	15.10	15.24	14.47	-0.039	2.60
5.191	22.560	60.000	118.3	40.1	124.9	0.111	0.64	18.72	18.73	290.8	291.5	15.11	15.24	17.72	-0.098	2.53
5.191	22.920	70.000	117.4	43.2	125.1	0.112	0.80	20.19	20.20	290.8	291.5	15.11	15.24	21.00	-0.160	3.90
5.192	23.280	80.000	114.0	54.3	126.2	0.113	0.86	25.47	25.47	290.7	291.5	15.11	15.24	24.28	-0.215	6.37
5.192	23.460	85.000	111.5	61.0	127.1	0.113	0.83	28.71	28.71	290.7	291.5	15.11	15.25	25.89	-0.230	6.70
5.192	23.640	90.000	102.2	65.1	121.2	0.108	0.72	32.48	32.48	290.9	291.6	15.11	15.24	27.44	-0.224	6.52
5.193	23.838	95.500	99.0	72.5	122.7	0.109	0.40	36.22	36.22	291.0	291.7	15.11	15.24	29.04	-0.149	5.62
5.193	23.928	98.000	97.7	75.2	123.3	0.110	0.20	37.59	37.59	291.0	291.7	15.11	15.24	29.76	-0.078	5.00
5.193	24.000	100.000	96.6	77.5	123.8	0.110	0.00	38.73	38.73	291.0	291.7	15.11	15.24	30.33	-0.000	4.54

AXIAL DIST	STREAM ABSOLUTE	RADIUS PERCENT	<--- VELOCITIES ----> MERID	REL WHIRL	REL TOTAL	MACH NUMBERS MERID	REL TOTAL	AIR REL WHIRL	ANGLES RADIAL	<-- TEMPERATURES ---> STATIC	TOTAL	RELATIVE	<---- PRESSURES ----> STATIC	TOTAL	RELATIVE	INC
0.000	20.400	0.000	64.5	56.5	85.7	0.058	0.077	41.24	0.00	289.8	290.4	290.1	14.99	15.10	15.05	-20.99
0.001	20.437	1.038	66.9	58.7	89.0	0.060	0.080	41.26	0.22	289.8	290.4	290.2	14.99	15.10	15.05	-20.67
0.004	20.508	2.996	71.5	63.0	95.3	0.064	0.085	41.36	0.54	289.8	290.4	290.2	14.99	15.10	15.06	-19.99
0.009	20.651	6.963	80.2	72.2	107.9	0.072	0.096	41.97	0.90	289.8	290.4	290.3	14.99	15.10	15.09	-18.18
0.014	20.819	11.648	89.7	84.1	123.0	0.080	0.110	43.16	1.12	289.8	290.4	290.5	14.99	15.10	15.12	-15.54
0.021	21.002	16.734	98.5	98.1	139.1	0.088	0.124	44.89	1.18	289.8	290.4	290.7	14.99	15.10	15.15	-12.39
0.034	21.391	27.532	106.7	116.3	157.8	0.095	0.141	47.45	1.03	289.8	290.4	290.9	14.99	15.10	15.20	-7.94
0.048	21.799	38.852	108.8	123.4	164.5	0.097	0.147	48.60	0.62	289.8	290.4	291.0	14.99	15.10	15.21	-5.91
0.062	22.203	50.082	109.0	127.0	167.3	0.097	0.149	49.37	0.13	289.8	290.4	291.1	14.99	15.10	15.22	-5.21
0.075	22.603	61.181	108.2	129.4	168.7	0.097	0.151	50.10	-0.35	289.8	290.4	291.1	14.99	15.10	15.23	-4.84
0.089	23.001	72.239	106.2	129.8	167.7	0.095	0.150	50.73	-0.80	289.8	290.4	291.1	14.99	15.10	15.23	-5.32
0.102	23.399	83.315	100.9	124.7	160.4	0.090	0.143	51.00	-1.19	289.8	290.4	291.0	14.99	15.10	15.21	-7.78
0.109	23.593	88.705	95.9	118.7	152.6	0.086	0.136	51.07	-1.25	289.8	290.4	290.9	14.99	15.10	15.19	-10.28
0.115	23.765	93.468	91.8	115.0	147.1	0.082	0.131	51.41	-1.11	289.8	290.4	290.8	15.00	15.10	15.18	-12.71
0.120	23.913	97.594	89.0	113.2	144.0	0.079	0.129	51.83	-0.65	289.8	290.4	290.8	15.00	15.10	15.17	-14.64
0.122	23.966	99.045	88.1	112.7	143.1	0.079	0.128	51.97	-0.29	289.8	290.4	290.8	15.00	15.10	15.17	-15.30
0.123	24.000	100.000	87.5	112.3	142.4	0.078	0.127	52.06	-0.00	289.8	290.4	290.8	15.00	15.10	15.17	-15.73

ACROSS THE ROTOR

PRES LOSS COEFF	SPACE CHORD RATIO	DIFFUSION FACTOR	STATIC PRES RISE INCOMP	STATIC PRES COEFFS COMP	DE HALLER NUMBER	MERID VELOCITY RATIO	WORK FUNCTIONS DH/U2*U2	FLOW FUNCTIONS VAM/U	ROTOR PRES RATIO	ROTOR TEMP RATIO	BLADE EFF	STREAM HEIGHT RATIO	LIFT COEFF
-0.0565	0.7070	0.8105	0.6505	0.7066	0.5911	0.4648	0.6436	0.4260	1.0168	0.0047	101.41	2.147	1.2151
-0.0324	0.7096	0.7840	0.6413	0.6831	0.5989	0.5754	0.6321	0.4415	1.0165	0.0046	100.88	1.731	1.1516
0.0002	0.7135	0.7318	0.6148	0.6321	0.6207	0.7113	0.6155	0.4700	1.0161	0.0046	99.99	1.398	1.0628
0.0629	0.7200	0.6400	0.5773	0.5355	0.6501	0.8585	0.5633	0.5238	1.0146	0.0043	97.25	1.156	0.8954
0.0589	0.7265	0.5352	0.4867	0.4456	0.7164	0.9822	0.5471	0.5810	1.0143	0.0042	96.62	1.010	0.7905
0.0940	0.7330	0.4759	0.4554	0.3751	0.7380	1.0247	0.5165	0.6324	1.0132	0.0040	92.84	0.968	0.6840
0.0585	0.7460	0.4063	0.3815	0.3308	0.7864	1.1137	0.5108	0.6727	1.0137	0.0041	94.39	0.891	0.6154
0.0475	0.7590	0.3972	0.3778	0.3331	0.7888	1.1246	0.4972	0.6730	1.0139	0.0042	95.09	0.885	0.5936
0.0513	0.7720	0.3993	0.3911	0.3387	0.7803	1.1104	0.4729	0.6616	1.0136	0.0041	94.42	0.897	0.5763
0.0572	0.7850	0.4052	0.4020	0.3403	0.7733	1.1049	0.4591	0.6454	1.0135	0.0041	93.70	0.903	0.5725
0.0602	0.7980	0.4143	0.4113	0.3430	0.7673	1.1061	0.4497	0.6222	1.0136	0.0041	93.51	0.904	0.5790
0.0558	0.8110	0.4483	0.4350	0.3666	0.7516	1.1111	0.4591	0.5816	1.0145	0.0044	94.77	0.901	0.6241
0.0932	0.8175	0.5043	0.5075	0.3989	0.7018	1.0349	0.4434	0.5481	1.0138	0.0043	91.92	0.968	0.6449
0.2134	0.8240	0.6362	0.6560	0.4275	0.5865	0.8642	0.4548	0.5207	1.0131	0.0045	83.49	1.160	0.6986
0.3611	0.8311	0.8439	0.8239	0.4534	0.4197	0.6368	0.5173	0.5018	1.0139	0.0052	76.82	1.571	0.8060
0.4116	0.8344	0.9366	0.8828	0.4665	0.3424	0.5231	0.5395	0.4957	1.0143	0.0054	75.18	1.910	0.8484
0.4430	0.8370	1.0078	0.9204	0.4776	0.2821	0.4315	0.5541	0.4917	1.0146	0.0056	74.38	2.312	0.8810

AXIAL DIST	MESH RADIUS ABSOLUTE	PERCENT	BLADE SPEED	VELOCITIES MERID	WHIRL	TOTAL	REL WHIRL	REL TOTAL	MACH NUMBERS TOTAL	REL TOTAL	AIR ANGLES RADIAL	WHIRL	REL WHIRL	REL AXIAL WHIRL	1/RAD CURV
2.163	20.400	0.000	151.32	30.0	192.2	194.5	-40.9	50.7	0.174	0.045	0.00	81.14	-53.76	-53.76	0.000
2.160	20.472	2.000	151.85	38.5	188.7	192.6	-36.9	53.3	0.172	0.048	0.34	78.47	-43.75	-43.75	-0.112
2.155	20.580	5.000	152.66	50.9	182.8	189.8	-30.2	59.1	0.169	0.053	0.68	74.45	-30.67	-30.67	-0.242
2.147	20.760	10.000	153.99	68.9	167.3	180.9	-13.3	70.2	0.162	0.063	1.02	67.62	-10.96	-10.96	-0.372
2.139	20.940	15.000	155.33	88.1	154.9	178.2	0.5	88.1	0.159	0.079	1.15	60.36	0.30	0.30	-0.412
2.131	21.120	20.000	156.66	101.0	138.2	171.2	18.4	102.6	0.153	0.092	1.15	53.86	10.34	10.34	-0.404
2.115	21.480	30.000	159.33	118.9	123.6	171.5	35.7	124.1	0.153	0.111	0.96	46.12	16.72	16.72	-0.299
2.099	21.840	40.000	162.00	122.4	118.8	170.5	43.2	129.8	0.152	0.116	0.56	44.14	19.46	19.46	-0.121
2.083	22.200	50.000	164.67	121.0	115.6	167.3	49.1	130.6	0.149	0.117	0.13	43.69	22.09	22.09	0.044
2.067	22.560	60.000	167.34	119.6	115.1	166.0	52.2	130.5	0.148	0.116	-0.30	43.92	23.59	23.59	0.194
2.051	22.920	70.000	170.01	117.4	117.4	166.0	52.6	128.7	0.148	0.115	-0.74	44.99	24.14	24.15	0.346
2.035	23.280	80.000	172.68	112.2	128.4	170.5	44.2	120.6	0.152	0.108	-1.15	48.87	21.53	21.53	0.519
2.027	23.460	85.000	174.02	99.3	133.7	166.6	40.3	107.1	0.149	0.096	-1.30	53.42	22.08	22.09	0.587
2.019	23.640	90.000	175.35	79.3	141.3	162.1	34.0	86.3	0.145	0.077	-1.25	60.70	23.21	23.21	0.552
2.010	23.838	95.500	176.82	56.7	155.8	165.8	21.0	60.4	0.148	0.054	-0.78	70.01	20.33	20.33	0.333
2.006	23.928	98.000	177.49	46.1	160.9	167.4	16.6	49.0	0.149	0.044	-0.41	74.02	19.75	19.75	0.163
2.003	24.000	100.000	178.02	37.8	164.4	168.7	13.7	40.2	0.150	0.036	0.00	77.06	19.87	19.87	0.000

PRESSURES STATIC	TOTAL	RELATIVE	TEMPERATURES STATIC	TOTAL	RELATIVE	MASS FLOW	DEV
15.03	15.35	15.05	290.0	291.8	290.1	0.00	-23.76
15.03	15.35	15.06	290.0	291.7	290.2	0.17	-19.07
15.04	15.34	15.06	290.1	291.7	290.2	0.51	-13.80
15.04	15.32	15.08	290.1	291.6	290.3	1.26	-4.98
15.04	15.31	15.11	290.2	291.6	290.5	2.27	-2.91
15.05	15.30	15.14	290.2	291.6	290.7	3.49	1.15
15.06	15.30	15.19	290.2	291.6	291.0	6.38	1.07
15.06	15.31	15.20	290.3	291.6	291.0	9.59	0.42
15.07	15.30	15.21	290.3	291.6	291.1	12.87	1.18
15.07	15.30	15.21	290.3	291.6	291.1	16.16	1.19
15.07	15.30	15.21	290.3	291.6	291.1	19.46	0.73
15.07	15.32	15.19	290.3	291.7	291.0	22.72	-1.52
15.07	15.31	15.17	290.4	291.6	290.9	24.24	0.53
15.07	15.30	15.14	290.5	291.7	290.8	25.53	5.78
15.08	15.31	15.11	290.6	291.9	290.8	26.61	10.44
15.08	15.31	15.10	290.7	292.0	290.8	26.99	15.64
15.08	15.32	15.09	290.7	292.0	290.8	27.23	20.87

AXIAL DIST	STREAM RADIUS ABSOLUTE	STREAM RADIUS PERCENT	<--- VELOCITIES ---> MERID	VELOCITIES WHIRL	VELOCITIES TOTAL	MACH NUMBERS MERID	MACH NUMBERS TOTAL	AIR ANGLES WHIRL	AIR ANGLES RADIAL	TEMPERATURES STATIC	TEMPERATURES TOTAL	PRESSURES STATIC	PRESSURES TOTAL	INC
3.138	20.400	0.000	29.0	192.2	194.4	0.026	0.174	81.42	0.00	290.0	291.8	15.03	15.35	6.60
3.138	20.497	2.687	40.4	187.6	191.9	0.036	0.171	77.84	-0.13	290.0	291.7	15.03	15.34	5.59
3.137	20.622	6.174	54.3	179.9	187.9	0.048	0.168	73.21	-0.22	290.1	291.7	15.04	15.34	4.32
3.136	20.818	11.622	74.3	163.5	179.6	0.066	0.160	65.57	-0.31	290.1	291.6	15.04	15.32	2.07
3.135	21.007	16.869	92.9	149.0	175.6	0.083	0.157	58.07	-0.34	290.2	291.6	15.05	15.31	-0.55
3.135	21.186	21.840	104.6	134.8	170.6	0.093	0.152	52.18	-0.33	290.2	291.6	15.05	15.30	-2.71
3.133	21.526	31.289	119.9	122.7	171.6	0.107	0.153	45.66	-0.17	290.2	291.6	15.06	15.30	-4.16
3.132	21.855	40.427	122.7	118.6	170.7	0.109	0.152	44.03	0.06	290.3	291.6	15.06	15.31	-3.90
3.131	22.182	49.512	121.5	115.6	167.7	0.108	0.150	43.58	0.32	290.3	291.6	15.06	15.30	-4.22
3.129	22.509	58.597	120.3	115.1	166.5	0.107	0.149	43.75	0.57	290.3	291.6	15.07	15.30	-4.13
3.128	22.839	67.758	118.6	116.4	166.1	0.106	0.148	44.47	0.79	290.3	291.6	15.07	15.30	-4.30
3.126	23.176	77.105	115.1	124.9	169.9	0.103	0.152	47.34	0.95	290.3	291.7	15.07	15.31	-5.05
3.126	23.347	81.872	108.8	130.4	169.8	0.097	0.152	50.14	1.01	290.3	291.7	15.07	15.31	-5.33
3.125	23.521	86.702	93.0	136.0	164.8	0.083	0.147	55.62	1.03	290.4	291.6	15.07	15.30	-4.26
3.124	23.743	92.862	67.4	148.9	163.4	0.060	0.146	65.65	0.81	290.6	291.8	15.08	15.30	-1.14
3.124	23.868	96.331	52.8	157.7	166.3	0.047	0.148	71.48	0.52	290.6	291.9	15.08	15.31	0.76
3.123	24.000	100.000	37.4	164.4	168.6	0.033	0.150	77.18	0.00	290.7	292.0	15.08	15.32	2.50

ACROSS THE STATOR

PRES LOSS COEFF	SPACE CHORD RATIO	DIFFUSION FACTOR	STATIC PRES RISE COEFFS INCOMP	STATIC PRES RISE COEFFS COMP	DE HALLER NUMBER	MERID VELOCITY RATIO	STAGE PRES RATIO	STAGE TEMP RATIO	<-EFFICIENCIES-> STAGE	<-EFFICIENCIES-> ACCUM	STREAM HEIGHT RATIO	LIFT COEFF
0.3748	0.7788	0.7975	0.8066	0.4321	0.4398	1.490	1.0088	0.0047	53.59	53.59	0.668	0.4247
0.3469	0.7815	0.7637	0.7818	0.4352	0.4671	1.237	1.0093	0.0046	56.99	56.99	0.806	0.4964
0.2978	0.7855	0.7129	0.7410	0.4434	0.5089	1.114	1.0099	0.0045	62.56	62.56	0.895	0.5442
0.1853	0.7923	0.6168	0.6536	0.4679	0.5886	1.058	1.0111	0.0042	74.64	74.64	0.943	0.5731
0.0992	0.7991	0.5464	0.5757	0.4757	0.6514	1.032	1.0122	0.0041	83.66	83.66	0.967	0.5954
0.0715	0.8059	0.5364	0.5581	0.4857	0.6648	0.974	1.0121	0.0040	84.80	84.80	1.025	0.6339
0.0708	0.8193	0.5077	0.5292	0.4575	0.6861	0.918	1.0126	0.0041	86.53	86.53	1.086	0.6462
0.0812	0.8320	0.5055	0.5230	0.4410	0.6906	0.909	1.0126	0.0042	86.07	86.07	1.096	0.6607
0.0806	0.8466	0.5087	0.5245	0.4431	0.6895	0.902	1.0123	0.0041	85.69	85.69	1.103	0.6715
0.0770	0.8592	0.5086	0.5211	0.4433	0.6920	0.907	1.0123	0.0041	85.52	85.52	1.096	0.6798
0.0725	0.8726	0.5049	0.5169	0.4437	0.6950	0.914	1.0124	0.0041	85.81	85.81	1.086	0.6781
0.0760	0.8867	0.4888	0.5027	0.4258	0.7052	0.945	1.0131	0.0043	86.50	86.50	1.049	0.6539
0.0986	0.8939	0.5089	0.5304	0.4310	0.6853	0.937	1.0128	0.0043	83.90	83.90	1.058	0.6489
0.0810	0.9009	0.5192	0.5393	0.4576	0.6787	0.993	1.0123	0.0043	81.21	81.21	0.998	0.6365
0.0954	0.9087	0.5608	0.5582	0.4621	0.6647	1.265	1.0120	0.0048	71.20	71.20	0.784	0.6070
0.1399	0.9122	0.5968	0.5816	0.4412	0.6469	1.569	1.0119	0.0052	64.49	64.49	0.633	0.5488
0.1789	0.9150	0.6248	0.5998	0.4207	0.6326	2.163	1.0118	0.0056	60.00	60.00	0.461	0.4426

AXIAL STATION 11 H03S STATOR EXIT STN 11 HP STATOR NO 1

AXIAL DIST	MESH RADIUS ABSOLUTE	MESH RADIUS PERCENT	<--- VELOCITIES ---> MERID	WHIRL	TOTAL	TOTAL MACH NO	<--- AIR ANGLES ---> RADIAL	WHIRL	AXIAL WHIRL	TEMPERATURE STATIC	TEMPERATURE TOTAL	PRESSURES STATIC	PRESSURES TOTAL	MASS FLOW	1/RAD CURV	DEV
5.188	20.400	0.000	43.2	73.7	85.5	0.076	0.00	59.62	59.62	291.4	291.8	15.17	15.23	0.00	0.000	24.95
5.188	20.472	2.000	50.0	74.4	89.6	0.080	-0.33	56.10	56.10	291.4	291.7	15.17	15.24	0.23	0.073	22.88
5.188	20.580	5.000	60.5	74.0	95.6	0.085	-0.60	50.76	50.76	291.3	291.7	15.17	15.25	0.65	0.118	19.71
5.188	20.760	10.000	78.6	70.7	105.7	0.094	-0.80	42.00	42.00	291.1	291.6	15.17	15.26	1.53	0.170	14.75
5.189	20.940	15.000	95.8	62.5	114.4	0.102	-0.81	33.11	33.11	291.0	291.6	15.17	15.28	2.66	0.218	9.63
5.189	21.120	20.000	101.8	49.9	113.4	0.101	-0.74	26.10	26.10	291.0	291.6	15.17	15.28	3.94	0.226	5.30
5.189	21.480	30.000	110.1	41.7	117.7	0.105	-0.50	20.74	20.74	291.0	291.6	15.17	15.29	6.72	0.162	3.08
5.190	21.840	40.000	111.5	38.2	117.9	0.105	-0.12	18.93	18.93	291.0	291.6	15.17	15.29	9.68	0.063	2.65
5.190	22.200	50.000	109.6	37.0	115.7	0.103	0.30	18.67	18.67	291.0	291.6	15.17	15.28	12.67	-0.038	2.47
5.191	22.560	60.000	109.0	37.2	115.2	0.103	0.72	18.85	18.85	291.0	291.6	15.17	15.28	15.67	-0.140	2.65
5.191	22.920	70.000	108.3	40.0	115.5	0.103	1.06	20.25	20.26	291.0	291.6	15.17	15.29	18.71	-0.240	3.97
5.192	23.280	80.000	108.8	50.2	119.8	0.107	1.25	24.78	24.78	291.0	291.7	15.17	15.30	21.79	-0.333	5.69
5.192	23.460	85.000	101.9	56.1	116.4	0.104	1.28	28.84	28.85	291.0	291.7	15.18	15.29	23.31	-0.372	6.84
5.192	23.640	90.000	92.3	63.1	111.8	0.100	1.20	34.33	34.34	291.1	291.6	15.18	15.28	24.71	-0.423	8.38
5.193	23.838	95.500	85.2	67.4	108.6	0.097	0.80	38.32	38.33	291.2	291.8	15.18	15.28	26.13	-0.370	7.73
5.193	23.928	98.000	82.9	68.6	107.6	0.096	0.46	39.59	39.59	291.4	291.9	15.18	15.28	26.75	-0.244	7.00
5.193	24.000	100.000	80.9	69.5	106.6	0.095	0.00	40.68	40.68	291.5	292.0	15.18	15.28	27.23	-0.000	6.49