

APPENDIX 5B

EXAMPLES OF ANALYSIS OF FAILURES

QUESTION 29-08 "Effect of combined tension and bending on curvature of beams in the plastic range".

Assessment A fair question which should have enabled the document to be traced without difficulty.

DOCUMENT P12956. Beam strength and curvature under combined tension and bending in the plastic range. Jnl. of Aero.Sc., 1955, pp 70-72.

Assessment 1½ page article under 'Readers Forum' in Jnl. of Aero. Sciences. No summary or conclusions. The title is actually a good precis of the article. However, the first paragraph refers to an article on the analysis of bending moments of rectangular beams, and goes on to discuss the Ramberg-Osgood form of stress-strain curve. As, presumably, the stress-strain curve can be used for the analysis of moments of other types of beam than rectangular, I feel that the indexer was quite correct in leaving out 'rectangular'.

FAILURES U.D.C.

INDEXING

Main system Alphabetical

Assessment

U.D.C. A 624.072.2 Beams  
B 539.413 Bending strength  
C 539.42 Tensile strength  
AB : BA : AC : CA

Should have included Plasticity at 539.214.

ALPHA. BEAMS - Bending strength. Calculation  
BEAMS - Tension. Calculation  
BEAMS - Deformation. Calculation

As in U.D.C., should have had an entry 'Plasticity', but as a subheading under BEAMS.

FACET Fhb Rp Rqe Rwm Ya Calculation: bending: tension: strength: beams. Again, should have included 'Plasticity'.

UNITERM Calculation Sections  
Strength Crosses  
Bending Curves  
Tension

Included 'Rectangular' but did not include 'Plasticity'. Otherwise the same aspects included as the other three systems.

ASSESSMENT OF SEARCHING

U.D.C. (1) A. 624.072.2 B. 621-402 C. 531.222 ABC  
(2) B  
(3) D 539.374 AD  
(4) E 539.384 AE  
(5) AC  
(6) E

The searcher tried 531.224 Bending stress, 539.38 Bending, deformation and 539.374 Plasticity, combined with Beams at 624.072.2. See 'General Comments' for further notes on the search programme.

ALPHA. BEAMS - Bending.  
Good; the document was found at the first attempt under BEAMS - Bending.

FACET (1) Fhb Rqe Rwm Bending: Tension: Beams. No.  
(Classified catalogue).  
(2) Fhb Rqm Bending: Beams. No. (Classified catalogue).  
(3) Fhb Rp Rqe Rqm Curvature: Tension: Bending: Beams.  
Found.

The searcher tried the classified catalogue only, in his three search programmes. If, with his first programme, he had used the chain index, the document would have been traced.

|                |         |     |            |     |
|----------------|---------|-----|------------|-----|
| <u>UNITERM</u> | Beams   | Yes | Curvature  | Yes |
|                | Bending | Yes | Plasticity | No  |
|                | Tension | Yes |            |     |

Adequate. The Uniterm Beams: Bending: Tension: Curvature, were all successful.

#### SUGGESTED RE-INDEXING

U.D.C. Plus D 539.214 Plasticity  
Ad : DA

ALPHA. Plus BEAMS - Plasticity

FACET Fhb Rip Rqe Rqm Ya Calculation: Bending: Torsion:  
Plasticity: Beams

UNITERM Plus PLASTICITY

#### COMMENTS

Time allowance An 8 minutes allowance, but 11 minutes used by the indexer. He should have had time to add 'Plasticity' in all four systems.

General Searching failure in U.D.C. because the searcher did not try 'Bending strength' at 539.413. Under the word 'Bending' in the Alphabetical index are 9 entries:-

- (1) 539.384 Bending: Deformation: Physics
- (2) 621.772.31 Bending: Workshop practice
- (3) 621.774.63 Bending, pipe: Workshop practice
- (4) 621.774.63 Bending, tube: Workshop practice
- (5) 539.413 Bending, strength: Resistance to stress: Physics.
- (6) 620.174 Bending strength tests: Materials testing
- (7) 630.174.251 Bending strength tests: High temperature: Materials testing
- (8) 531.224 Bending stresses: Resolution of forces: Mechanics
- (9) 620.178.3 Bending tests, impact: Materials testing

Although the references numbers 2, 3, 4 on Workshop practice can be eliminated, and numbers 6, 7 and 9 Bending strength tests put on one side for a later search programme, numbers 1, 5 and 8 are all in the Physics section under Deformations, Resistance of stress or Resolution of forces. It is sometimes extremely difficult, when indexing, to decide in particular, into which of the last two sections a particular aspect should be placed. However, with a question such as the one herewith, there is really little indication which number one should try first.

The section 'Resistance to stress' and 'Resolution of forces' always involved difficult decision when indexing. Therefore reason for failure actually searching, due to multiplicity of possible places in alphabetical index.

#### REASONS FOR FAILURE

U.D.C. Searching.

QUESTION 49-06 "Starting flow characteristics in feed systems of liquid propellant rocket motors".

Assessment Appears to be a fair question which should trace the document.

DOCUMENT P14927. Analysis of flow-system-starting dynamics of turbopump-fed liquid propellant rockets. NASA Memo. 4-21-59E.

Assessment NASA Memo of 18 pages plus 17 pages of figures, etc. 14-line summary. Gives the methods of calculation of the speed response time of the turbopump, the flow response time and the maximum dynamic line loss. The analysis is based on work done in rocket starting at the Lewis Research Center.

FAILURES Facet.

INDEXING

Main system Alphabetical

Assessment

U.D.C. 621.45.032. Fuel systems. Rocket engines  
621.45.057.54 Starting. Rocket engines.

Quite sufficient, without going into too much detail.

ALPHA. (1) FUEL SYSTEMS, ROCKET - Analysis  
(2) ENGINES, ROCKET - Starting  
(3) FLOW PROBLEMS

The last heading, I think, is rather too general for application here.

FACET Gf Pce Vfd Starting: liquid fuels: rocket engines. An incorrect entry. Gf should read Gj. The document would then have been traced. However, there is a place at Gjb for liquid propellant rocket engines which should have been used instead. (See General Comments).

|                |         |            |
|----------------|---------|------------|
| <u>UNITERM</u> | Flow    | Rockets    |
|                | Systems | Engines    |
|                | Fuels   | Starting   |
|                | Liquids | Turbopumps |

Includes the same aspects as the other systems, plus the addition of 'Turbopumps', which was a Uniterm used for the first time.

NASA INDEXING ENGINES, ROCKET  
ENGINES, CONTROL - Rocket  
FUEL SYSTEMS  
TURBOPUMPS

ASSESSMENT OF SEARCHING

U.D.C. (1) A 621.45.018.5 Performance. Rocket engines  
B 662.75 Liquid fuels  
AB. No.

(2) 621.45.032 Fuel systems. Rocket engines. Found.  
Document found at the second attempt under 621.45.032. Fuel Systems.  
Rocket engines. If the searcher had, at the first attempt, used the concept 'Starting' she would have traced the document immediately under 'Starting'.  
'Rocket engines'. 621.45.057.54.

ALPHA. (1) ROCKETS, LIQUID PROPELLANT - Starting. No.  
(2) ENGINES, ROCKET - Starting. Found.

Document found also at the second attempt.

FACET (1) Gjb Liquid propellant rocket engines. No.  
(Classified catalogue).  
(2) Gj Rocket engines. No. (Classified catalogue)  
(3) Gn Fuel systems. Checked in chain index for  
combination of Gj or Gjb. No.

Adequate searching, and the document should have been found had the indexer not made a clerical error.

|                |          |     |         |     |
|----------------|----------|-----|---------|-----|
| <u>UNITERM</u> | Engines  | Yes | Fuels   | Yes |
|                | Rocket   | Yes | Systems | Yes |
|                | Starting | Yes | Liquid  | Yes |

Success all the way through.

#### SUGGESTED RE-INDEXING

U.D.C. A 662.75 Liquid fuels  
AB : AC : BA : CA

ALPHA. Could add entry under ROCKETS, LIQUID PROPELLANT but as the document is on the starting of the rocket engine, I feel this the more accurate entry.

FACET (1) Gjb Vfd Starting: Liquid propellant rocket engines  
(2) Gjb Gn Fuel systems: liquid propellant rocket engines

UNITERM Unnecessary

#### COMMENTS

Time allowance 8 minutes allowance but 9 minutes taken. The clerical error in Facet may have been caused by haste through shortage of time.

##### General

(1) Facet. On occasions, I think there is too much subdivision, i.e. under Rocket engines one finds Gjb Liquid propellant rocket engines, and Gjd Solid propellant rocket engines, although it is possible to describe liquid propellant rocket engines by:-

(a) Gj Pce Liquid fuels: rocket engines

(b) Gj Pck(Pre) Liquid: propellants: rocket engines

Therefore there are three possible ways of indexing this document, each of which is admissible by the schedules.

(2) Indexing failure because of clerical error (presumably because the indexer made the entry without checking the schedules). In any case, perhaps Gjb Liquid Propellant Rocket Engines would have been better.

#### REASONS FOR FAILURE

Facet Indexing.

QUESTION 51-06 "Structural influence coefficients for thin low aspect ratio wings".

Assessment Fair question, but one which may well be difficult to search. 'Structural influence coefficients' are difficult to define in most systems. Many possible places to check. If this question had been presented in a library, further details should have been asked for.

DOCUMENT P15110. A method for deflection analysis of thin low-aspect ratio wings. NACA Tech. Note 3640.

Assessment A 65-page NACA Technical Note, with an 11-line summary. Refers also to the idealized structure of box beams. Also includes deflection of wing-body combinations.

FAILURES Alphabetical. Facet.

INDEXING

Main system Uniterm

Assessment

U.D.C. A 539.384 Bending. B 533.693 Wings. C 533.69.031 Aspect ratio. BAC : ACB : ABC. Insufficient permutation. Should also have added BCA : CBA.

ALPHA. WINGS - Deflection. Analysis. ASPECT RATIO. Fair indexing which covered the same aspects as U.D.C.

FACET Cd Ogt Rwm Xy Analysis: Bending: Aspect ratio: Fair indexing which covered the same aspects as U.D.C. and Alphabetical.

|                |             |           |           |
|----------------|-------------|-----------|-----------|
| <u>UNITERM</u> | Deflections | Ratios    | Computers |
|                | Analysis    | Wings     | Machines  |
|                | Slender     | Parabolic | Loads     |
|                | Low         | Linear    | Spars     |
|                | Aspects     | Chords    | Stringers |

Adequate indexing.

ASSESSMENT OF SEARCHING

U.D.C. (1) A 533.69.031 Aspect ratio. B 533.693 Wings BA. No.

(2) A Found at A 539.384 : 533.693.

Adequate as far as the question goes. The document was found at the second attempt. If, however, the indexer had made sufficient permutations, the document would have been found at the first attempt.

ALPHA. (1) WINGS - Aspect ratio. No.  
(2) WINGS, SWEPTBACK - Aspect ratio. No.  
(3) WINGS, DELTA - Aspect ratio. No.  
(4) WINGS, TRIANGULAR - Aspect ratio. No.  
(5) WINGS, SUPERSONIC - Aspect ratio. No.  
(6) WINGS, SUPERSONIC - Aspect ratio. No.  
(7) WINGS, SWEPTBACK, SUPERSONIC - Aspect ratio. No.  
(8) WINGS, SWEPTBACK, TRANSONIC - Aspect ratio. No.

The searcher tried 8 types of wing - aspect ratio. If he had gone to Aspect Ratio as main heading, the document would have been traced.

FACET (1) Cd Wings, Oqt Aspect ratio, (Zqj) Low. Checked chain index under 'Low' plus other two aspects. No.  
(2) (Iv) Thin. Checked classified catalogue under Cd(Iv)Oqt. No.

The searcher insisted upon Wings: Aspect ratio: Low, which was quite realistic. If the indexer had added (Zqj) Low, to the entry, the document would have been traced.

|                |        |     |            |     |
|----------------|--------|-----|------------|-----|
| <u>UNITERM</u> | Wings  | Yes | Thin       | Yes |
|                | Low    | Yes | Design     | No  |
|                | Aspect | Yes | Structures | No  |
|                | Ratio  | Yes |            |     |

Adequate.

#### SUGGESTED RE-INDEXING

U.D.C. A, B and C as before, but BC and CB.

ALPHA. WINGS - Aspect ratio (although this was rarely used as subheading).

FACET Cd Oqt(Zqj)Rqm Xy Calculation: Bending: Low: Aspect ratio: Wings. Plus (Zqj) Low.

UNITERM Unnecessary.

#### COMMENTS

Time allowance 8 minutes allowed and 8 minutes taken. This is a long article to read and presumably the indexer had no time for more detailed indexing.

General Searching failure in Alphabetical because the searcher did not check under 'Aspect ratio' as main heading. Also an indexing failure because the indexer did not use 'Aspect ratio' as subheading under WINGS. Indexing failure in Facet. If the indexer had added (Zqj) Low the document would have been traced.

#### REASONS FOR FAILURE

ALPHA. (1) Searching (2) Indexing

FACET Indexing.

QUESTION 63-08 "Three dimensional boundary layers on slender wings".

Assessment Misleading question. The document refers to a delta wing - admittedly a thin delta wing, but the term 'slender' usually is associated with thin low-drag wings and has been so interpreted by the searchers.

DOCUMENT P16338. An approximate method of calculating the laminar boundary layer on a delta wing. R.A.E. Tech.Note 2595.

Assessment 19 pages of text. R.A.E. Tech.Note 2595 plus 9 pages of figures. 9 line summary. The article concerns a method of calculating the laminar boundary layer on a delta wing, with assumed conical irrotational flow.

FAILURES Alphabetical. Facet.

INDEXING

Main system Uniterm.

Assessment

U.D.C. A 532.526.2 Laminar boundary layer  
B 533.693.31 Delta wings  
AB : BA

Appears to cover the subject of the article adequately, even though only two entries have been made.

ALPHA. WINGS, DELTA - Flow distribution  
BOUNDARY LAYER, LAMINAR - Calculation  
Summary as U.D.C.

FACET Cd(Ij)Ncd Nfk Ya. Calculation: boundary layer: laminar flow:  
delta: wings.  
Summary as U.D.C.

UNITERM Calculation Layers  
Laminar Triangular  
Boundaries Wings

R.A.E. INDEXING 532.526.2: 533.693.3 Laminar boundary layer. Delta wings.  
Same as the project indexer.

ASSESSMENT OF SEARCHING

U.D.C. (1) A 533.693+ Wings, including all subdivisions  
B 532.526 Boundary layer  
BA No.  
(2) A  
B 532.526.2 Laminar boundary layer  
BA Found at BA. 533.693.31

Document found at the second attempt because the searcher tried 532.526.2 : 533.693+ Therefore checking laminar boundary layer: wings of all types.

ALPHA. (1) WINGS, LOW DRAG - Flow distribution. No.  
(2) WINGS - Flow. No.  
(3) BOUNDARY LAYERS. No.

Not found because the searcher tried Boundary layer and considered that to go through the whole section of Boundary layer, laminar and Boundary layer, turbulent, etc. would be unrealistic. As far as the question went, she made an adequate search.

FACET

(1) Cd(Iv)Nfk (Classified catalogue) Boundary layer:  
Slender: Wings. No.

(2) Cd(Iv) (Classified catalogue) Slender: Wings. No.

Searcher tried whole section of Cd(Iv) Slender: Wings in the classified section. Considered any further search too involved but she should have gone to the chain index to see if Cd(Iv) were included with any type of aircraft, etc., higher up the schedules. Would not have traced the document.

UNITERM

|             |            |
|-------------|------------|
| Calculation | Layers     |
| Laminar     | Triangular |
| Boundaries  | Wings      |

Considered a success, but as only Wings, Layer and Boundary came out, I do not think it really sufficient.

SUGGESTED RE-INDEXING

U.D.C.

A 533.693 Wings B 532.526.2 Laminar boundary layer.  
Would still have been found at the second attempt.

ALPHA.

WINGS, LOW DRAG - Flow distribution.  
Would have been found at first attempt.

FACET

Cd(Iv)Nfk Boundary layer: Slender: Wings

UNITERM

Slender.

COMMENTS

Time allowance 16 minutes allowance. 16 minutes taken.

General

The document has been re-indexed above so that the term 'slender' has been included. In all fairness to the original indexer, I feel that it would not have been included by most people.

REASONS FOR FAILURE

In both cases, the misleading question. If the enquirer had been at the librarian's side when the search was made, the misunderstanding would have been cleared up.

Summary

ALPHA.

Question

FACET

Question

QUESTION 75-08 "Rate of shrinkage of phenolic-mineral moulding compounds at 125°C".

Assessment Fair question. Phenolic resins are specifically mentioned in the second paragraph.

DOCUMENT P17553. Plastics at high temperatures. Machine Design, April 16th 1959, pp 171-174.

Assessment One page of text plus three pages of charts. Discusses temperature effect on shrinkage of phenolic, melamine and polyester resins. The subheading 'Previously unpublished data on the shrinkage of thermo-setting molded plastics after thermal ageing', is in itself sufficient to enable the indexer to index the document accurately without further assessment.

FAILURES Alphabetical. Facet.

INDEXING

Main system Uniterm

Assessment

U.D.C. A 678.5 Plastics  
B 621-181 Dimensions  
C 536.45 High temperature  
ABC : ACB

The indexer has made permutations under Plastics only.

ALPHA. PLASTICS - Temperature effect  
PLASTICS - Dimensions. Temperature effect  
Has indexed the same material as U.D.C.

FACET Ph Rab Ssb(Zqn)(Zb) Stability: high: temperature: plastics.  
The same as U.D.C. and Alphabetical plus 'stability'.

UNITERM Plastics Stability  
High Dimensions  
Temperature Shrinkage  
Has included the same aspects as Facet plus 'shrinkage'.

ASSESSMENT OF SEARCHING

U.D.C. (1) A 678.632 Phenolic resins  
B 620.192.52 Shrinkage  
AB No.  
(2) A 547.56 Phenols. No.  
(3) A 678.632.32.21 Phenol formaldehyde. No.  
(4) A 678.5 B 620.192.52 AB No.  
(5) A 678.5 B 536.45 AB Yes.

The searcher found the document at the fifth attempt, after searching through 'Phenolic resins', 'Phenols', 'Phenol formaldehyde' (all next to each other in the alphabetical index). She then tried Plastics and shrinkage, finally plastics and high temperature, where the document was traced.

- ALPHA. (1) PLASTICS - Forming. No.  
(2) PLASTICS - Moulding. No.  
(3) FORMING. No.  
(4) MOULDS. No.

Inadequate. The searcher tried only the aspects of moulding and forming and ignored the reference to temperature in the question. At his third attempt he should have checked under PLASTICS - Temperature effect, which would have traced the document.

- FACET (1) Phenolic plastics (chain index). No.  
(2) Phenolic resins (chain index). No.  
(3) Shrinkage (chain index). No.

The searcher tried 'Phenolic plastics', 'Phenolic resins' and 'Shrinkage'. I think he should have tried 'Plastics' plus 'Temperature' as his next search programme.

- |                |                |             |     |
|----------------|----------------|-------------|-----|
| <u>UNITERM</u> | Moulding. No.  | Shrinkage   | Yes |
|                | Phenol. No.    | High        | Yes |
|                | Minerals. No.  | Temperature | Yes |
|                | Plastics. Yes. |             |     |

Good. The searcher tried 'Plastics' after trying 'Phenolic', 'Mineral', 'Mouldings'.

#### SUGGESTED RE-INDEXING

- |                |   |
|----------------|---|
| <u>U.D.C.</u>  | A, B, C, as before plus D 620.192.52 Shrinkage<br>ACD : ADC : DAC |
| <u>ALPHA.</u>  | PLASTICS - Shrinkage  |
| <u>FACET</u>   | Plus Ph Rji Ssb(Zqn) High: Temperature: Shrinkage: Plastics       |
| <u>UNITERM</u> | Unnecessary   |

#### COMMENTS

Time allowance 4 minutes allowance, but only 3 minutes taken. I feel that the indexer would have had time to add 'shrinkage' to U.D.C., Alphabetical and Facet. If he had done so, the document would have been a success with the Facet system.

General (1) What is the difference between phenolic resins and phenolic plastics? In Facet, there is a place for each. Phyb and Pia respectively. Yet the article is on plastics, and refers to phenolic resins.

(2) Searching failure in Alphabetical, as the searcher tried only one of the three concepts shown in the question. Also, in Facet, because the searcher did not try 'Plastics' at all, but limited his search to 'Phenolic resins' and 'Phenolic plastics'.

(3) Indexing failure in Facet, because the indexer should (and had time to) have included 'Shrinkage'. If he had done so, the document would have been traced. The inclusion of 'shrinkage' in Alphabetical would have made no difference to the results, as the searcher did not try this aspect, although the word is included in the lists as a recognised subheading. There was provision for 'shrinkage' in all systems, but the indexer included it only under Uniterm.

#### REASONS FOR FAILURE

- |               |                             |
|---------------|-----------------------------|
| <u>ALPHA.</u> | Searching                   |
| <u>FACET</u>  | (1) Searching (2) Indexing. |

QUESTION 41-07 "Pilotless aircraft autostabilizer response to an impulsive pitching moment".

Assessment Appears a fair question, which should have enabled the document to be traced.

DOCUMENT P14116. A method of optimising aircraft autostabilizer systems. College of Aeronautics Report 113.

Assessment College of Aeronautics Report. 61 pages. Full report, but it is adequately summarized on the first half-page. In 16 minutes, the indexer should have been able to index sufficiently and accurately.

FAILURES U.D.C. Facet. Uniterm.

INDEXING

Main system Alphabetical.

Assessment

U.D.C. A 533.6.013.4 Stability  
B 518.12 Method of numerical calculation  
C 533.694.5.001.1 Design of controls  
CAB : AB.

Bad. Indexer indexed stability of control surfaces under aerodynamic section and ignored the aircraft engineering section which should have been indexed.

ALPHA. STABILISERS - Application  
STABILISERS - Design  
AEROPLANES, PILOTLESS - Stability. Control  
STABILITY - Control. Calculation  
INTEGRALS - Solution  
RESPONSE, TRANSIENT  
STABILITY DERIVATIVES - Calculation

Adequate. Document found at first attempt under STABILISERS.

FACET Cp: Ob: Vbd: Yz. Calculation: Design: Stability: Control surfaces.  
The indexer indexed the stability of control surfaces only. Did not mention autopilots, pilotless aircraft which would have been sensible places.

UNITERM Calculations Systems  
Stability Equations  
Optimum Pilotless  
Nonlinear Pilots  
Design

As Facet.

ASSESSMENT OF SEARCHING

U.D.C. 1. A 629.13.014.59+ Automatic Pilots+ No.  
2. A 629.135.27+ Pilotless aircraft+ No.  
3. A 533.6.013.15 Pitching moments  
B 533.665 Aeroplanes  
AB+ No. BA+ No.  
4. A 533.6.013.412 Longitudinal stability  
B 533.665 AB+ No.  
5. A 533.6.013.412  
B 629.135.27 AB+ No.

Adequate.

ALPHA. STABILISERS. Found under subheading 'Application', at the first attempt.

FACET Bn Ewm Nub Pitching moments: Autopilots: Pilotless aircraft. Checked chain index under Pitching moments plus either Auto-pilots or Pilotless aircraft. No.

Bn Pilotless aircraft. Checked in classified section. No.  
Ewm Autopilots+ Ob Stability. Checked in chain index under Stability + Autopilots. No.

Ewm Autopilots. Checked in classified section under Autopilots. No.  
Adequate.

|                |             |    |           |     |
|----------------|-------------|----|-----------|-----|
| <u>UNITERM</u> | PITCHING    | No | PILOTLESS | Yes |
|                | MOMENT      | No | AIRCRAFT  | No  |
|                | STABILISERS | No | STABILITY | Yes |
|                | AUTOMATIC   | No | RESPONSE  | No  |
|                | MISSILES    | No |           |     |

Adequate.

#### SUGGESTED RE-INDEXING

U.D.C. D 629.13.014.59 Automatic pilots  
E 629.135.27 Pilotless aircraft  
D. E.

ALPHA. Adequately indexed. Perhaps plus PILOTS, AUTOMATIC. MOMENTS, PITCHING.

FACET Ewm Nub Autopilots: pitching moments  
Bn Nub Ob Stability: pitching moments: pilotless aircraft.

UNITERM STABILISERS PITCHING  
AUTOMATIC MOMENTS

#### COMMENTS

Time allowance 16 minutes, although the indexer took 19 minutes. Appears she spent too long on indexing the main system adequately and not enough time in the subsidiary system.

General I have noticed that, with all the indexers, there is a tendency in Uniterm to translate the words used in Facet (which is on the same side of the card), and to forget other terms used in U.D.C. and Alphabetical. Frequently a document has to be 'squeezed into' Facet in a rather unsatisfactory way. Indexing failure throughout. It appears that the indexer must have spent too much time in reading the document and indexing by the main system and too little time in the subsidiary systems.

#### REASONS FOR FAILURE

U.D.C. Indexing  
FACET Indexing  
UNITERM Indexing

QUESTION 56-07 "Value of model testing for predicting instability of structural elements".

Assessment Rather a vague question. Further information would have been asked for had the question been posed in a library. What structural elements particularly are meant ?

DOCUMENT P15606. Study of size effect in sheet-stringer panels.

Assessment NACA Technical Note. 8 pages of text, 20 pages of figures, tables and photographs. Good summary, but the emphasis in the report is on the effect the difference in size has upon calculations made in sheet stringer panel models. This emphasis appears to have been ignored by the indexer.

FAILURES U.D.C. Facet. Uniterm.

INDEXING

Main system U.D.C.

Assessment

U.D.C. A 669.715 [7075-T6] B 621.415 C 620.173  
Ignored model testing and stringer panels but managed to include aluminium alloys [ ].

ALPHA. Ignored the same subjects as U.D.C. PANELS and SHEETS are two separate headings which I think should be made one.

FACET Ignored the same subjects as U.D.C.

UNITERM Ignored the same subjects as U.D.C.

ASSESSMENT OF SEARCHING

U.D.C. Tried only analogies 530.17. Ignored 'structural elements' part of the question.

ALPHA. Searcher's train of thought led from MODELS, STRUCTURES to PANELS - Stability and PANELS, ALUMINIUM ALLOY to SHEETS, ALUMINIUM ALLOY.

FACET Searcher gave up without trying, or he said that the question was too general to be attempted with the Facet chain index.

UNITERM Adequate.

SUGGESTED RE-INDEXING

U.D.C. D 530.17 Analogies  
E 629.13.012.723 (do not like this number but only place for Stringers)  
DBA: BD: ED: DE

ALPHA. MODELS, STRUCTURAL

FACET Fbk Ffh(Zs)Rqg Vi Tests: compression: model: panels: stringer.

UNITERM MODELS  
STRINGERS

### COMMENTS

Time allowance 2 minutes only. Obviously influenced the indexer, but I feel that he should have realised the importance of the size effect.

General A difficult rather vague question for which to search. It should have been supplemented with further information. The importance of size effect should have been sufficiently indexed as it surely can be applied to different structural elements. Generally the indexer failed to bring out 'Model tests'.

### REASONS FOR FAILURE

|                |              |
|----------------|--------------|
| <u>U.D.C.</u>  | (1) Indexer  |
|                | (2) Searcher |
|                | (3) Question |
| <u>FACET</u>   | (1) Searcher |
|                | (2) Question |
|                | (3) Indexer  |
| <u>UNITERM</u> | (1) Indexer  |
|                | (2) Searcher |
|                | (3) Question |

QUESTION 57-08 "Flexure torsion flutter characteristics of aerofoils".

Assessment Fair question which should have traced the document.

DOCUMENT P15724. Measurement of the derivative  $z_w$  for oscillating wings in cascade. College of Aeronautics Report 93.

Assessment College of Aeronautics Report. 14 pages of text and figures. Purpose of experiment to measure the damping derivative for rectangular wings in cascade. Describes the apparatus and methods of test.

FAILURES U.D.C. Alphabetical. Facet.

INDEXING

Main system Alphabetical.

Assessment

U.D.C. Bad. 534.14 Methods of exciting vibrations, used instead of 533.6.013.422 Flutter. Presumably careless due to lack of time. (2 minutes).

ALPHA. Fair indexing, but the use of WINGS, OSCILLATING and WINGS - Flutter is rather ambiguous. In this case the first was used when the second could have been used equally as well.

FACET Adequate.

UNITERM Adequate.

ASSESSMENT OF SEARCHING

U.D.C. Adequate. If document indexed correctly, should have been traced.

ALPHA. Inadequate. Searcher tried AEROFOILS only - did not try WINGS.

FACET Searcher gave up as too many entries in the chain index under Flutter and Wings.

UNITERM Found.

SUGGESTED RE-INDEXING

U.D.C. B and A 533.6.013.422  
AB BA  
Document would have been traced.

ALPHA. WINGS - Flutter. Better searching, document would have been found.

FACET Nothing to add.

UNITERM Nothing to add.

COMMENTS

Time allowance 2 minutes. Careless indexing in U.D.C. presumably due to this.

General

U.D.C. Indexing failure because of carelessness in finding the correct place for Oscillations.

ALPHA. Inadequate searching.

FACET Searching failure due to the multiplicity of entries in the chain index under Flutter and Wings.

REASONS FOR FAILURE

U.D.C. Indexing

ALPHA Searching

FACET Searching

QUESTION 57-10 "High strength alloys".

Assessment General question, which would have brought out sufficient other documents to satisfy the enquirer if he were not able to give more details. Should also have traced the document indexed, if very general headings had been used. (Against our usual indexing procedure of indexing as specifically as possible). A too general question for a specific article.

DOCUMENT P15760. High strength aluminium casting alloy 40E  
DTD 5008, latest developments and foundry experience. Metallurgia,  
Vol. 55, Jan-June 1957, pp 79-85.

Assessment 6 pages from Metallurgia. The article is specifically on the method of melting, casting, moulding, application and properties of aluminium alloy 40E. Most of the article concerned with casting the alloy. Has a good summary.

FAILURES U.D.C. Alphabetical. Facet.

INDEXING

Main system Alphabetical.

Assessment

U.D.C. A 669.715 (DTD 5008) Aluminium alloys (DTD 5008)  
B 669.715 (40E) Aluminium alloys (40E)  
C 621.746 Casting  
AC : BC : CA : CB

Indexed under DTD number, 40E and casting. Fair. (On actually checking U.D.C., I find three more places in which this could have been placed:

1. 669.018.28 Casting alloys
2. 669.715-141 Sand cast aluminium alloys
3. 669.018.45 High strength alloys.

ALPHA. ALLOYS, ALUMINIUM (DTD 5008) Casting  
ALLOYS, ALUMINIUM (40E) Casting

As in U.D.C. there are two other possible places for entry:

1. ALLOYS, CASTING, ALUMINIUM
2. ALLOYS, HIGH TEMPERATURE

FACET 1. Peal-a (DTD 5008) Qb Casting: aluminium alloys (DTD 5008)  
2. Peal-a (40E) Qb Casting: aluminium alloys (40E)

Found under Facet, but no more details entered. Searcher, who was also indexer, apparently had remembered indexing several articles in high strength aluminium alloys, and so she went to the classified section under Peal-a where she found document.

UNITERM Alloys 400  
Aluminium Casting  
500 DTD

### ASSESSMENT OF SEARCHING

U.D.C. 669.018.45+ No. High temperature alloys.  
Tried 669.018.45 only. Went as far as question stated, obviously expecting general article on high strength alloys.

ALPHA. ALLOYS, HIGH TEMPERATURE+ No.  
ALLOYS + No.  
MATERIALS, HEAT RESISTANT No.

The searcher tried the obvious headings.

FACET 1. Rp(Zqn) High: strength. Checked the chain index at strength and found four places with Rp(Zqn)+ either Pe-a (Alloys) or Pf (Steels) No.  
2. Ssd (High temperature). Checked the chain index at (High temperature) + Pe-a (Alloys) and Pf (Steels). Too many to check. Searcher had a vague recollection of seeing articles on high strength aluminium alloys, therefore checked first, the cards with combination of Peal-a (Aluminium alloys) and Ssd (High temperature). Document found.

Found, because searcher knew she had indexed several articles on high strength aluminium alloys.

|                |           |     |            |    |
|----------------|-----------|-----|------------|----|
| <u>UNITERM</u> | ALLOYS    | Yes | STRENGTH   | No |
|                | ALUMINIUM | Yes | PROPERTIES | No |

Went as far as question suggested.

### SUGGESTED RE-INDEXING

U.D.C. D 669.018.45 Heat resistant alloys  
CD

ALPHA. ALLOYS, HIGH TEMPERATURE

FACET Ssd, which is High Temperature to make indexing even with other systems, but actually could use Rp(Zqn) High: strength. Answer would be to index under both.

UNITERM STRENGTH  
HIGH  
TEMPERATURE

### COMMENTS

Time allowance 2 minutes. In the time allowed, the indexer indexed the document adequately and specifically. Would have taken another 2-3 minutes to add the entries required to trace the document.

#### General

1. The variance between classification schemes shown. Very often the indexer is undecided whether to classify each document separately and specifically to the best of his ability with each scheme, or to give even indexing throughout by the use of the same terms. e.g. High strength alloys in U.D.C. go under High temperature alloys. The same with Alphabetical. Facet can be put under Rp(Zqn) meaning High: Strength: or under Ssd, High temperature to equal indexing with other systems. Uniterm - Ability to do either or both.

2. A general question prepared from a specific document which has been indexed specifically. The question would have been better answered by other documents, or a chapter in a general work on metallurgy.

3. Indexing insufficient. If entries had been made under High strength alloys throughout or where there is no place, 'high temperature alloys', the document would have been traced. Due to time control of 2 minutes.

REASONS FOR FAILURE

|                |              |
|----------------|--------------|
| <u>U.D.C.</u>  | (1) Question |
|                | (2) Indexing |
| <u>ALPHA.</u>  | (1) Question |
|                | (2) Indexing |
| <u>UNITERM</u> | (1) Question |
|                | (2) Indexing |

QUESTION 75-06 "What are the aerodynamic characteristics of an 'arrow-wing' at high Mach numbers".

Assessment Misleading question. Mach 3 is not a high Mach number. 3 of the searchers checked the indexes under 'hypersonic' instead of 'supersonic'.

DOCUMENT P17501. Idealized wings and wing-bodies at a Mach number of 3. NACA TN.4361.

Assessment NACA Technical Note. As the first paragraph states, the purpose of the paper is to describe the theoretical possibilities for obtaining high lift-drag ratios at Mach 3 .... for delta, arrow wings, and wing-body combinations. No summary. 6 pages of text.

FAILURES U.D.C. Facet. Uniterm.

INDEXING

Main system Uniterm

Assessment

U.D.C. A 533.693 Wings  
B 533.685.12 Wing-body combinations  
C 533.6.013.13 Lift  
D 533.6.011.5 Supersonic flow  
ACD : ADC : BCD : BDC

Would have been better to have indexed 533.693.34 (Arrowhead wings) 533.693.31 (Delta wings) but probably had no time.

ALPHA. WINGS, SUPERSONIC - Lift-drag ratio  
COMBINATIONS, WING-FUSELAGE, SUPERSONIC -  
Lift-drag ratio

Should also have indexed under arrowhead wings and delta wings.

FACET 1. Cc Cd Ea Nbk Nq Lift: supersonic flow: fuselages:  
wings: combinations  
2. Cd Nbk Nq Lift: supersonic flow: wings

Should also have indexed under arrowhead wings and delta wings.

UNITERM Wings Supersonic  
Bodies Lift  
Fuselage Drag  
Combinations Ratios

Should also have indexed under arrowhead wings and delta wings.

ASSESSMENT OF SEARCHING

U.D.C. 1. A 533.693.34 Arrowhead wings  
B 533.6.011.55 Hypersonic flow  
AB No.  
2. A No.

Adequate, although misled by high Mach numbers.

ALPHA. WINGS, ARROWHEAD, SUPERSONIC - Aerodynamics. No.  
WINGS, ARROWHEAD, No.  
WINGS, HYPERSONIC. No.  
WINGS, SUPERSONIC. Found at subheading Lift-drag ratio.

Should have been indexed under arrowhead wings and delta wings.

FACET Cd WINGS (Imd) ARROWHEAD  
Cd (Imd)+ No.  
Adequate, although ignored Nbm Hypersonic Flow.

|                |             |     |                 |    |
|----------------|-------------|-----|-----------------|----|
| <u>UNITERM</u> | ARROWHEAD   | No  | TRIANGULAR      | No |
|                | WINGS       | Yes | HYPERSONIC      | No |
|                | AERODYNAMIC | No  | CHARACTERISTICS | No |

Adequate.

#### SUGGESTED RE-INDEXING

U. D. C. Instead of 533.693 should have  
A 533.693.34 Arrowhead wings  
E 533.693.31 Delta wings

Document would then have been found.

ALPHA. WINGS, ARROWHEAD, SUPERSONIC

FACET Cd(Imd)Nbk Nq Lift: supersonic flow: arrow: wings  
Cd(Ij)Nbk Nq Lift: supersonic flow: delta: wings

UNITERM Arrowhead. Delta.

#### COMMENTS

Time allowance 4 minutes. Obviously the indexer felt that he had no time to index delta and arrowhead wings separately.

General Three concepts in the question: (1) Aerodynamic characteristics (general). (2) Arrow wings (specific). (3) High Mach numbers (specific).  
1. Too general as article indexed specifically under 'lift'.  
2. Specific - not mentioned by indexer.  
3. Misleading - should have been 'supersonic'.

#### REASONS FOR FAILURE

1. Question. The searchers checked 'hypersonic', as the question refers to high Mach numbers.
2. Lack of indexing. If the indexer had indexed 'arrowhead' and 'delta', the documents would have been found in all cases.

#### Summary

|                 |                              |
|-----------------|------------------------------|
| <u>U. D. C.</u> | (1) Question<br>(2) Indexing |
| <u>FACET</u>    | (1) Question<br>(2) Indexing |
| <u>UNITERM</u>  | (1) Question<br>(2) Indexing |

QUESTION            78-08 "Required: equation for stresses and deflection produced by a single concentrated load (not at the centre) on a clamped circular plate".

Assessment        On the surface, and in comparison to the title, this appears a misleading question but on reading the article, the theory of stresses in a circular plate is given at the beginning, followed by an extension to the theory for semi-circular plates.

DOCUMENT           P17855. Displacements and stresses of a laterally loaded semicircular plate with clamped edges. Jnl. Applied Mech. Vol. 26, June 1959, pp 224-226.

Assessment        As the title suggests, plus the theory on stresses in circular plates. A three page article, with approximately only one full page of text, the remainder being equations, tables and figures.

FAILURES           Alphabetical. Facet. Uniterm.

INDEXING

Main system        Facet.

Assessment

U.D.C.            A 621-415 Plates  
                      B 531.22 Stress analysis  
                      AB

There is only one place for semicircular plates.

ALPHA.            PLATES, SEMICIRCULAR - Stress analysis  
Should have made entry under 'Plates, circular' too.

FACET            Ffe(Iqb)Rm Xy Analysis: stresses: semicircular: plates.  
Indexed 'semicircular'plates and ignored 'circular' plates.

UNITERM          Displacement                Plates  
                      Stresses                    Analysis  
                      Semicircular

As Facet.

ASSESSMENT OF SEAR CHING

U.D.C.            1. 621-415 Plates  
                      531.22+ Stress distribution  
                      AB+ Found

ALPHA.            1. PLATES, CIRCULAR - Stresses No.  
                      2. PLATES, CIRCULAR - Deflection No.

Adequate from question. No reason for the searcher to check under semi-circular plates.

FACET            1. Ffe Plates (Ipc)Circular Ffe(Ipc) No.  
                      2. Fqd Discs. No.

Adequate from question. No reason for the searcher to check under semi-circular plates.

|                |          |     |            |    |
|----------------|----------|-----|------------|----|
| <u>UNITERM</u> | PLATES   | Yes | DEFLECTION | No |
|                | CIRCULAR | No  | EQUATIONS  | No |
|                | FIXED    | No  | LOADS      | No |
|                | STRESSES | Yes |            |    |

Adequate from question. No reason for the searcher to check under semi-circular plates.

#### SUGGESTED RE-INDEXING

|                |  |
|----------------|--|
| <u>U.D.C.</u>  | Not necessary                                      |
| <u>ALPHA.</u>  | PLATES, CIRCULAR - Stress analogy                  |
| <u>FACET</u>   | Ffe(Ipc)Rm Xy Analysis: stresses: circular: plates |
| <u>UNITERM</u> | CIRCULAR   |

#### COMMENTS

Time allowance 2 minutes. Obviously limited the indexer, but I feel that he might have had time for the extra entries.

General Presumably lack of time was the reason for the inadequate indexing although I feel that the indexer should have been able to include the above. Though perhaps he read only the title and indexed this. (Circular plates are mentioned in the summary too).

#### REASONS FOR FAILURE

|                |         |
|----------------|---------|
| <u>ALPHA.</u>  | Indexer |
| <u>FACET</u>   | Indexer |
| <u>UNITERM</u> | Indexer |

QUESTION 79-06 "Effect of Reynolds number on measurements of pitching moment at transonic speeds".

Assessment Appears to be a fair question, though one would expect a document generally on the methods of measuring pitching moments to be traced, rather than an article on the stability of a particular type of model aircraft. Normally an indexer is careful to index as completely as possible, including the type of wing, body, etc. with which the aerodynamic characteristics occur.

DOCUMENT P17912. Longitudinal stability and control characteristics of a semispan model of a supersonic airplane configuration at transonic speeds from tests by the NACA wing-flow method. NACA RM LG830.

Assessment A NACA RM. 8 pages of text with 22 pages of figures. A good, very detailed summary. The aeroplane model specified has a long fuselage, straight wing and tail of low aspect ratio with double-wedge aerofoils - 4.6% chord thickness. Describes apparatus and tests.

FAILURES U.D.C. Alphabetical. Uniterm.

INDEXING

Main system Uniterm.

Assessment

U.D.C. A 533.6.013.412 Longitudinal stability  
B 533.694.53 Longitudinal control  
C 533.6.057 Wing flow method  
D 533.6.011.35 Transonic flow  
ACD : ADC : BCD : BDC : CAD : CBD

Has covered longitudinal stability and control in transonic flow and model tests (533.6.057) very well, but has ignored types of model, etc.

ALPHA. CONTROL, LONGITUDINAL - Wing flow tests  
STABILITY, LONGITUDINAL - Wing flow tests  
WING FLOW TESTS

As U.D.C.

FACET 1. Nbj Oak Vi Tests: longitudinal control: transonic flow  
2. Nbj Ocb Vi Tests: longitudinal stability: transonic flow

As U.D.C.

|                |              |       |
|----------------|--------------|-------|
| <u>UNITERM</u> | Longitudinal | Flows |
|                | Stability    | Wings |
|                | Control      | Tests |
|                | Transonic    |       |

As U.D.C.

ASSESSMENT OF SEARCHING

U.D.C. 1. A 533.6.013.15 Pitching moments  
B 533.6.011.12 Reynolds number effect  
C 533.6.011.35 Transonic flow  
ABC No.

2. BA No.
3. A No.
4. B No.

Inadequate.

ALPHA.

1. REYNOLDS NUMBER No.
2. MOMENTS, PITCHING No.
3. WINGS - Moments, pitching No.  
(a) WINGS, TRANSONIC - Moments, pitching No.

Inadequate.

FACET

1. Nbj Njm Nub Pitching moments: Reynolds number: Transonic flow.
2. Nbj Ocb Found. Longitudinal stability: Transonic flow.

Found because searcher thought of trying 'longitudinal stability', which is the next logical step from 'pitching moments'.

|                |             |    |              |     |
|----------------|-------------|----|--------------|-----|
| <u>UNITERM</u> | REYNOLDS    | No | MOMENTS      | No  |
|                | NUMBER      | No | TRANSONIC    | Yes |
|                | MEASUREMENT | No | FLOW         | Yes |
|                | PITCHING    | No | AERODYNAMICS | No  |

Found. As Facet.

SUGGESTED RE-INDEXING

General Not necessary to re-index for the form of question, as it should have been found by the searcher. Would take too long to index adequately the whole of the document.

COMMENTS

Time allowance 2 minutes which I think for the question is adequate. If the indexer had been allowed any more time he would probably have indexed in much more detail and omitted the general headings he made.

General In this case, I feel the time allowance was sufficient to enable the document to be traced from the question. A general question for a specific paper. Searching failure throughout. The searchers should have tried 'longitudinal stability' and if they had done so they would have traced the document without any trouble.

REASONS FOR FAILURE

|                |           |
|----------------|-----------|
| <u>U.D.C.</u>  | Searching |
| <u>ALPHA.</u>  | Searching |
| <u>UNITERM</u> | Searching |

QUESTION 30-06 "What is the average decrease in gas consumption per horse power hour for reciprocating engines in the course of their history".

Assessment A fair question on the surface. Yet, after reading the paper (15 minutes) I found a single sentence upon which the question is based.

"It must be remembered that the gas consumption of reciprocating engines used to be 1/10 of a gallon per horse power hour which amounted to about 0.6 lb. per h.p. hour and yet today this has been reduced to almost half this figure".

This information is certainly not sufficiently exact to satisfy the questioner.

A 'trick' question.

DOCUMENT P13059. The Economics of large aircraft. Aero. Eng. Review, Vol. 15, April 1956, pp 48-55.

Assessment 7 pages in length. An article about the history of flying boats, present and future uses, together with costs, capabilities, fuel consumption, etc. A quite detailed, meaty article, with the single sentence upon which the question is based tucked away on page 6.

FAILURES U.D.C. Alphabetical. Facet. Uniterm.

INDEXING

Main system Facet.

Assessment

U.D.C. A 533.655.2.001.1 Design of float seaplanes  
B 629.135.52.001.1 Design of flying boats  
A : B

He should have made entries under the economics of flying boats, etc. This would not have traced the document, but it would have been better indexing.

ALPHA. FLYING, BOATS - Design  
AEROPLANES, TRANSPORT - Design

Assessment as U.D.C.

FACET (1) B(Abd)Vbd Design: cargo: aircraft  
(2) Bef Vbd Design: flying boats  
(3) B(Aba)Vbd Design: transport: aircraft

Assessment as U.D.C.

|                |              |         |
|----------------|--------------|---------|
| <u>UNITERM</u> | Design       | Freight |
|                | Flying boats | Weight  |
|                | Transports   | Payload |
|                | Aircraft     |         |

Assessment as U.D.C.

ASSESSMENT OF SEARCHING

U.D.C. A 621.43.018.35 Fuel consumption  
B 629.13.055.7 Fuel consumption meters  
C 621.432 Piston engines  
(1) A - No  
(2) B - No  
(3) C - No

Adequate searching.

ALPHA. (1) Engines, piston - No  
(2) Fuels - No  
(3) Fuel consumption - No

Adequate searching.

FACET (1) Gb Piston engines - No  
(2) Gc Piston engines, by cycle - No  
(3) Gdg Radial engines - No

Adequate searching.

UNITERM Engines - No  
Reciprocating - No  
Piston - No  
Aeroplanes - No  
Petrol - No  
Consumption - No  
Life - No

Adequate searching.

#### SUGGESTED RE-INDEXING

U.D.C. )  
ALPHA. ) Could not re-index to trace document without being  
FACET ) completely unfair to the indexer.  
UNITERM )

#### COMMENTS

Time allowance 8 minutes. Could not possibly have indexed information at all unless he did word by word indexing.

General A 'trick' question. Obviously the questioner was determined to find a part of the paper that would not have been indexed.

#### REASONS FOR FAILURE

Mean question on material that could not have been indexed without spending all day on one article.

#### Summary

U.D.C. Question  
ALPHA. Question  
FACET Question  
UNITERM Question

QUESTION 44-10 "Cooling the engine in high speed flight".

Assessment On the surface, and when searching, the question appeared to be too vague. One wanted to know what type of engine was meant. However, the article is about the use of fuel in any type of supersonic engine and so one can see why the question was thus phrased.

DOCUMENT P14478. Fuel systems for supersonic engines. Royal Aero. Soc. Jnl. Vol.60, 1958, pp 654-658.

Assessment An article is about fuel systems, and the control and use of fuel for cooling supersonic engines. It is a full article which would take ten minutes to read carefully. There is a good introduction, which adequately summarizes the contents and in this introduction the use of fuel for cooling purposes is mentioned. Injection methods are mentioned, and graphs of fuel temperature at different altitudes are given.

FAILURES U.D.C. Alphabetical. Facet. Uniterm.

INDEXING

Main system U.D.C.

Assessment

U.D.C. A 629.13.012.525 Fuel systems, aircraft structures.  
Incorrect. Caused by bad printing in the alphabetical index. Should have added 3.

B 621.43.032 Fuel systems, heat engines

C 629.13.072.2 High speed aircraft

AC : BC : CA : CB

No mention of cooling or engines in general.

ALPHA. Only entry FUEL SYSTEMS - Design.  
Inadequate.

FACET Gn Vbd Design. Fuel systems  
Inadequate.

|                |            |               |
|----------------|------------|---------------|
| <u>UNITERM</u> | DESIGN     | ENGINES       |
|                | FUELS      | DEVELOPMENT   |
|                | SYSTEMS    | INJECTION-ORS |
|                | SUPERSONIC |               |

Inadequate.

ASSESSMENT OF SEARCHING

- U.D.C.
- (1) A 621.438 Gas turbine engines  
B 621-71+ Cooling  
AB - No
  - (2) C 621.438.086.4 Ducted fan engines  
CB - No
  - (3) D 621.438.085.5 Free turbine engines  
DB - No
  - (4) E 621.438.084 Jet engines  
EB - No
  - (5) F 621.438.086.2 Propjet engines  
FB - No

- (6) G 621.439.2 Pulsejet engines  
GB - No  
(7) H 621.439.4 Ramjet engines  
HB

Adequate searching from the information obtained from the question.

ALPHA. (1) ENGINES, GAS TURBINE - Cooling No  
(2) ENGINES, ROCKET - Cooling No  
(3) ENGINES - Cooling No  
(4) ENGINES, RAMJET - Cooling No  
(5) COOLING SYSTEMS No

Adequate searching from the information obtained from the question.

FACET (1) Nbm Stc Cooling: Hypersonic flow. Checking in the chain index under Cooling. No entry.  
(2) Stc Cooling. 22 places - No.  
(3) Gt Cooling systems - No.

Adequate searching from the information obtained from the question.

|                |         |     |            |     |
|----------------|---------|-----|------------|-----|
| <u>UNITERM</u> | Cooling | No  | Flight     | No  |
|                | Engines | Yes | Supersonic | Yes |

Adequate searching from the information obtained from the question.

#### SUGGESTED RE-INDEXING

U.D.C. A 621.438 Gas turbine engines  
B 621-71 Cooling  
AB : BA

ALPHA. ENGINES - Cooling  
COOLING SYSTEMS

FACET Ga Stc Cooling: Engines

UNITERM Cooling

#### COMMENTS

Time allowance 12 minutes. In this time, I think the indexer should have covered the use of fuel for cooling purposes.

General The indexer obviously felt that the question asked from this document would be covered by entries under 'Fuel systems' only and ignored the possibility of entry under methods of cooling the engines.

#### REASONS FOR FAILURE

Fault of the indexer entirely. She had time to index this particular aspect of the paper, although if she had indexed other aspects, such as flow rate of fuels, temperature of fuel, etc., all of which are dealt with in the paper, she would have spent approximately 20 minutes in indexing.

#### Summary

|                |          |
|----------------|----------|
| <u>U.D.C.</u>  | Indexing |
| <u>ALPHA.</u>  | Indexing |
| <u>FACET</u>   | Indexing |
| <u>UNITERM</u> | Indexing |

QUESTION 57-09 "Influence of human engineering (pilot) factors in forecasting of load spectrum (load statistics) of aeroplanes".

Assessment Quite a fair question which was lifted from the last sentence of the half-page summary.

DOCUMENT P15744. Some aspects of prediction of load spectrum for airplanes. AGARD Report No.106.

Assessment This is not about aerodynamic loads, as the indexer has implied, (probably due to lack of time (2 mins.) in which to assimilate a 50 page document), but about load spectrum and fluctuations. It has taken 10 minutes to read the introduction, main headings, conclusions and one or two other necessary sections to clear this matter up. A full and detailed report.

FAILURES U.D.C. Alphabetical. Facet. Uniterm.

INDEXING

Main system Alphabetical.

Assessment

U.D.C. A 533.69.048.1 Aerodynamic loads  
B 519.2 Statistics  
C 629.13.012 Aircraft structures  
CAB : ACB

Should not have used 533.69.048.1 Aerodynamic loads.

ALPHA. STRUCTURES, AIRCRAFT - Loads, aerodynamic  
STRUCTURES, AIRCRAFT - Loads, manoeuvring  
LOADS, AERODYNAMIC - Statistical analysis

Should not have used 'Loads, aerodynamic' but 'Loads, manoeuvring' was quite in order.

FACET C Npb Yd Analysis (math.): Aerodynamic loads: Aircraft structures. Npb also incorrect.

UNITERM Loads: Aircraft: Structures: Spectrum: Calculations.  
Missed 'Aerodynamic' out for some reason, but added 'spectrum', therefore should have been found.

AGARD INDEXING 629.13.012 Aircraft structures.

ASSESSMENT OF SEARCHING

U.D.C. A 624.042 Calculation of loads  
B 611 Human engineering  
C 629.13.012 Aircraft structures  
D 624.046 Permissible loads  
(1) AB - No. (2) B - No. (3) CAB - No. (4) D - No.

Good - if the document had been indexed properly, it would have been found.

ALPHA. (1) HUMAN ENGINEERING - No.  
(2) AEROPLANES - Loads - No.

Bad - if it had been searched for adequately, under STRUCTURES, AIRCRAFT-Loads, it would have been found.

FACET (1) Mup Pilots (in chain index). 11 searches - No.  
(2) Zz (Human engineering) - No.

Bad - concentrated on human engineering - ignored all other aspects.

|                |        |     |            |     |
|----------------|--------|-----|------------|-----|
| <u>UNITERM</u> | PILOTS | No  | STATISTICS | No  |
|                | HUMAN  | No  | AIRCRAFT   | Yes |
|                | LOADS  | Yes |            |     |

Bad - should have tried 'spectrum' and 'calculations' and document would have been found.

#### SUGGESTED RE-INDEXING

|                |  |
|----------------|--|
| <u>U.D.C.</u>  | A 629.13.012 Aircraft structures   |
|                | B 624.040 Loads, permissible (not happy about this number, but appears to be the best place) |
|                | C 611  |
|                | AB : BA : CAB : BAC : ABC  |
| <u>ALPHA.</u>  | STRUCTURES, AIRCRAFT - Loads   |
|                | HUMAN ENGINEERING  |
| <u>FACET</u>   | C Rq Yn Statistics: Loading: Aircraft structures   |
| <u>UNITERM</u> | HUMAN  |
|                | ENGINEERING  |

#### COMMENTS

Time allowance 2 minutes - only allowing time to read the title and index. This is a 40 page report. Although the indexer made a mistake in assuming 'load spectrum' referred to aerodynamic loads, this would have probably been corrected if more time had been allowed for indexing.

General Without touching on the pilot factor in the question, this document would have been found for reasons below. To index it to include the pilot factor would have taken approximately 20 minutes, as one would have included manoeuvre of aircraft, stresses in structures, military transport, etc.

#### REASONS FOR FAILURE

A combination of bad indexing, which shows up particularly in U.D.C. and Facet and bad searching, in Alphabetical and Uniterm. The document would have been found under these last two systems if the searcher had been thorough enough, but would not have been found in U.D.C. or Facet because of the incorrect indexing.

#### Summary

|                |                            |
|----------------|----------------------------|
| <u>U.D.C.</u>  | Indexing                   |
| <u>ALPHA.</u>  | (1) Searching (2) Indexing |
| <u>FACET</u>   | Indexing                   |
| <u>UNITERM</u> | (1) Searching (2) Indexing |

QUESTION 21-08 "Comparison of calculated and experimental performance of an axial compressor stage having constant stator inlet air angle of 50% reaction at mean stage radius".

Assessment A detailed question, which if the document were indexed and searched for adequately, would give the required document.

DOCUMENT P12136. The design and testing of an axial compressor having a mean stage temperature rise of 30°C. N.G.T.E. Report 148.

Assessment N.G.T.E. Report with 11 pages of text and 12 pages of figures. A half-page summary. The report describes a compressor designed to give a mean stage temperature rise of 30°C. Details of the six stage characteristics are given. A full description of the design of the compressor, performance and testing are given.

FAILURES Alphabetical

INDEXING

Main system Alphabetical

Assessment

U.D.C. A 621.438.031.3 Axial compressors  
B 533.69.048.2 Pressure distribution  
C 536.5 Temperature  
D 621.438.031.3.018.5 Performance of axial compressors  
D : AB : BA : AC : CA. Covered the performance of axial compressors with 621.438.031.3.018.5 also pressure distribution, temperature and axial compressors at 621.438.031.3.

ALPHA. COMPRESSORS, AXIAL - Pressure distribution. Tests.  
COMPRESSORS, AXIAL - Temperature. Tests.

An important implication of the paper is the design of the axial compressors. If an entry had been made under COMPRESSORS, AXIAL - Design, the document would have been found at the second attempt. Also 'performance' should have been included as a subheading.

FACET Gf Gwd Gyb Ssb(Zdb)Vi Tests: rise: temperature: six-stage: axial flow compressors: gas turbine engines. Ignored 'design' of axial flow compressors. Also went up to Gf Gas turbine engines. I do not think this essential.

|                |             |              |
|----------------|-------------|--------------|
| <u>UNITERM</u> | Tests       | Compressors  |
|                | Temperature | 600          |
|                | Rise        | Blowdown     |
|                | Engines     | Performance  |
|                | Gases       | Design       |
|                | Turbines    | Pressure     |
|                | Axial       | Distribution |
|                |             | Blades       |

Adequate.

### ASSESSMENT OF SEARCHING

U.D.C. Good; the searcher tried 'Performance of compressors' at 621.438.031.3.018.5 and traced the document immediately.

ALPHA. Good; the searcher used the same search programme as U.D.C. but drew a blank. She then tried 'Compressors - Design' and finally the whole section under INTAKES. She did not try the complete section - COMPRESSORS, AXIAL as she thought that either of the two subheadings already tried should have traced the document. Also there would be over 150 cards to check.

FACET The searcher tried 'Axial flow compressors' whole section of 150, and then looked in the chain index. Document was traced under Gf Gwd plus 16. I think that he should have insisted upon some qualification before checking under whole section.

UNITERM Found under 'Compressors: Axial: Performance: Stages'.

### SUGGESTED RE-INDEXING

U.D.C. Unnecessary.

ALPHA. COMPRESSORS, AXIAL - Performance  
COMPRESSORS, AXIAL - Design

FACET Gf Gwd Gyb Vbd Design: Six-stage: Axial-flow compressors:  
Gas turbine engines.

There is no placing for 'Performance' in Facet, other than the section referring to performance of aircraft.

UNITERM Unnecessary.

### COMMENTS

Time allowance 16 minutes allowance. 17 minutes taken. In this time, I feel that the document should have been indexed in more detail in Alphabetical. The indexer should have had time to equate the entries in each system. (It is impossible to enter 'Stages' in Alphabetical or U.D.C., as there is no suitable place

#### General

(1) Although Alphabetical was the main system, the indexer included more in his U.D.C. entries. If he had covered the same, i.e. by the addition of the sub-heading 'Performance' in Alphabetical, the document would have been traced at the first attempt.

(2) The searcher in Facet checked the whole section in the classified catalogue under Axial flow compressors at Gwd, although the searcher in Alphabetical would not try the general heading COMPRESSORS, AXIAL, as she considered it should have been traced under the subheadings chosen.

### REASONS FOR FAILURE

ALPHA. Indexing.