

**ROAD RESEARCH LABORATORY**

**Ministry of Transport**

**RRL REPORT LR 177**

**RRL COMPUTER-AIDED  
TECHNICAL INFORMATION SERVICE**

by

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**ROAD RESEARCH LABORATORY  
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# RRL COMPUTER-AIDED TECHNICAL INFORMATION SERVICE

## ABSTRACT

The design and operation of the Road Research Laboratory Technical information service which is now available, is described. The storage and retrieval system adopted is a compromise between a fully computerized system requiring large computer storage and a tedious manual system. The main feature of the system is its simplicity.

The Laboratory's computer is being used for the time-consuming search to identify relevant documents. From then on an abstract of each document is scanned on a microfilm reader/printer and a print of a relevant abstract is immediately available.

The Report describes how the input is obtained, the nature and selection of material stored, and the storage and retrieval procedures for a current awareness service and for retrospective retrieval.

No scale of charges for the service has been fixed because the computer at present being used is shortly to be replaced.

## I. INTRODUCTION

The Library of the Road Research Laboratory has always provided the Laboratory's research staff with a current awareness service. It has also provided the staff and others outside with abstracts of literature in the field of roads and road transport research. The former service was provided by scanning the incoming literature and matching documents with users' interests and the latter by the monthly publication of *Road Abstracts*.

The Laboratory now includes on its staff several hundred potential users of the information service. It is therefore no longer possible to provide an effective current awareness service unless users' requirements are automatically matched to document input. Road research covers a very broad subject field which includes the design of the road structure, construction methods and the materials used, road traffic and transportation and road safety, including the road user and the vehicle, and in a monthly publication space can only be found for abstracts of the most important documents.

It was therefore decided to develop an information service using the Laboratory's existing computer to do the tedious searching and matching, leaving the information staff to do the work of selecting, abstracting and indexing.

## 2. AIMS OF THE INFORMATION SERVICE

The aim was to provide a rapid information service at a relatively low cost. The requirements of the service were:

- (i) To keep the scientific staff of the Laboratory and other users informed about recently published articles, books, monographs, specifications, patents, etc of interest to them by matching user subject-interests with newly accessioned material, and by the monthly publication of Road Abstracts.
- (ii) To answer enquiries and prepare bibliographies from material available to the Laboratory.
- (iii) To provide information on current research into highway problems.

## 3. ACQUISITION AND SELECTION OF MATERIAL FOR STORAGE

The input to the information system consists of world-wide coverage of two main types of information

- (i) Information concerning published and unpublished material from serial and non-serial publications, reports, books, theses, conference proceedings, standards and patents. At present material published in 1965 and subsequent years is stored on the computer but it is the intention that some of the material for earlier years, which is at present indexed on a conventional hierarchical index and manually retrieved, will be reindexed for computer storage.
- (ii) Information concerning research planned or in progress in the field of roads and road transport research and related subjects. This information was first included in 1966; it is regularly updated and out-of-date information is eliminated.

The information is obtained from world-wide sources within the framework of the International Road Research Documentation (IRRD) scheme set up in 1965 under the auspices of the Organisation for Economic Co-operation and Development. The system is based on selecting and disseminating information in the form of abstracts. Each IRRD member country is responsible for analysing and indexing its own literature; material from non-member countries is shared. Information is therefore analysed and indexed once only.

The IRRD scheme is semi-centralized, there being three Co-ordinating Centres. The Road Research Laboratory is one of these centres; the other two are Laboratoire Central des Ponts et Chaussées in Paris and the Forschungsgesellschaft für das Strassenwesen in Cologne, supported

by the Bundesanstalt für Strassenwesen. So far the other members are Austria, Belgium, Canada, Denmark, Ireland, Netherlands, Norway, Portugal, Spain, Sweden and Switzerland. A co-ordinating committee consisting of documentalists from the three co-ordinating countries, a representative from OECD and an OECD consultant is responsible for developing the scheme and supervising its operation.

### 3.1 Published articles

In the IRRD scheme some 800 periodicals from 36 countries are regularly scanned as well as technical reports, book, monographs, specifications, patents, conference proceedings etc. Selections are made by the technical information and library staff at RRL in consultation with the research staff, and by the staff and documentalists in the various member countries. Members prepare abstracts of selected material in one of the three official languages (French, English and German) adopted by IRRD. The abstracts are indexed using keywords selected from a trilingual thesaurus of terms (see Section 4).

At weekly or monthly intervals members send their abstracts on standard forms, known as information sheets (reproduced in Fig. 1), to the Co-ordinating Centre responsible for the language used. In general the sheet is accompanied by a copy of the original document. The Centre assigns an IRRD accession number and copies are sent to all members on reproducible paper so that any sheet can be further copied for distribution by members as part of their own national information service. French and German abstracts are translated into English at RRL, if necessary.

A high percentage of the selections received from other IRRD member countries is included in the RRL information storage system. The input of abstracts of published articles is at present of the order of 6000 per year.

### 3.2 Current research projects

As part of their commitment in the IRRD scheme member laboratories are required to provide abstracts of research planned or in progress in their country in the field of roads, road transport and related subjects. Some members are not yet in a position to collect and supply this information and the International Road Federation (IRF) in Washington is providing interviewers and funds as part of their world survey of road research. Close co-operation exists between IRRD and IRF and the aim is to make all information collected by one body available to the other and vice versa, thus effectively covering the field without any duplication of effort. Both bodies use the same form, or research project sheet as it is called (see Fig. 2). The information given on the research project sheet includes full address, research workers concerned, cost, progress, reports issued, and an abstract. The abstract describes the aims of the research and the way it is organized, methods used and stages planned. The information is indexed using the same thesaurus of terms and is circulated, processed, and translated if necessary, in the same way as information sheets (see 3.1 above).

## 4. INDEX TERMS

All material selected for storage is indexed using terms, or keywords, selected from a three-

language (French, English and German) thesaurus of terms in the field of roads and road traffic research and related subjects. The thesaurus was prepared by the Co-ordinating Committee, the OECD consultant and linguistic experts in co-operation with other members of the IRRD scheme and the technical staff of the member laboratories. A sample page taken from the numerical thesaurus is reproduced as Fig. 3.

The thesaurus contains some 2500 coded keywords plus additional terms that are closely related in meaning and concept to coded (or authorised) terms, or are near synonyms of them. Related terms, which are not translated into the other two languages of the thesaurus, carry the code number of the authorized term to which they are related. The keywords are classified into the following basic ideas, or subject areas, to help the indexer select appropriate keywords:

02 Highway type	36 Strength of materials	65 Medicine
03 Junction	37 Stress analysis	67 Mathematics
05 Highway design	39 Measuring apparatus	68 Statistics
06 Road structure	40 Test	70 Physics
08 Engineering structure	42 Pavement design	71 Mechanics
09 Bridge	43 Properties	73 Optics
11 Construction	46 Town planning	74 Electricity
14 Technology	47 Weather	76 Nucleonics
17 Geology	49 Signalization	77 Chemistry
18 Geomorphology	50 Traffic	79 Chemical element
20 Hydrogeology	52 Parking	80 Chemical compound
21 Rock	53 Economics of transport	82 Organic chemistry
23 Material	55 Vehicle	83 Plastic material
24 Concrete	56 Components of the car	85 Information technics
26 Bituminous material	58 Rule of the road	86 Administration
27 Working	59 Safety	88 Documentation
29 Weathering	61 Road user	89 Generalities
33 Chemical analysis	62 Human body	
34 Applied mechanics	64 Psychology	

These areas embrace the whole field at present covered by the IRRD thesaurus and each constitutes the central point of a diagram, identified by a two-digit number, with arrows linking the keywords corresponding to related ideas. The arrow diagram principle has been adopted to overcome the difficulty experienced by an indexer in selecting the most suitable terms from an alphabetical.

The position of a word on a chart and the assignment of a word to one chart in preference to another is often, of necessity, arbitrary, but external links connect associated keywords

appearing on different diagrams. Each diagram has co-ordinates to permit easy codification of keywords. The diagram for highway type, 02, is reproduced in Fig. 4 and, reading up and then along, the code number for motorway, for example, is identified by the digits 63 prefaced by the diagram number 02, i.e. 02.63.

Development and extension of the IRRD thesaurus is envisaged and it has been designed to allow for the extension of existing subject areas and for the inclusion of new areas.

## 5. THE STORAGE AND RETRIEVAL SYSTEM

As a result of the IRRD the coverage of world-wide information on roads and road transport and related subjects is fairly extensive and the real problem in any large information system is to identify those documents which are relevant to a particular enquiry or to a particular user-interest.

At RRL it was decided to use the Laboratory's existing computer for this identification process only. Thus computer time, particularly print-out time, is kept to a minimum and the costs are kept to reasonable proportions. Programs were written by the computer section for the Laboratory's Pegasus II computer. An English Electric 4/70 will be installed late in 1968 and the stored information will then be transferred to the new computer.

### 5.1 Input

As already stated the input to the system is selected articles of interest to research workers and others in the highway engineering field and information of current road research projects, indexed using terms selected from a three-language thesaurus of terms.

### 5.2 Storage on the computer

The information that is keypunched, stored on magnetic tape\* and printed out for any selection includes the IRRD accession number, followed by all the keywords assigned to the document, up to a maximum of sixteen. The choice of 16 keywords was considered to be sufficient to describe any article and is compatible with the structure of the Pegasus computer in which the storage locations are grouped into blocks of eight, each location being capable of storing two keywords.

The tape has a capacity of 16 locations per section, up to eight of which can store two keywords each, and up to eight can store seven characters; this permits 56 characters to be used to describe the bibliographic information. The IRRD accessions are stored in numerical order, each entry consisting of the IRRD accession number of a document followed by the code numbers of the keywords describing that document; in the case of IRRD information sheets limited bibliographic details are given on the following line. The title given to the magnetic tape file on which the information is stored is INFORMATION FILE. An example of the storage printout is shown in Fig. 5. Before the material is stored on the English Electric 4/70 computer the cost/benefit will be examined of including fuller bibliographic details.

To operate the current awareness service newly entered material is not transferred to the main computer store until it has been matched with standing requests for newly stored information which satisfies the index-term specifications of users.

\* or possibly disc store in the English Electric 4/70

### 5.3 Computer retrieval

The user's information need is expressed by the information officer in a series of index terms selected from the three-language thesaurus. To evaluate the question more precisely some logical combination of these index terms is included by using the connectors 'AND' and 'OR'.

The request is then keypunched (Fig. 6) and fed into the computer for matching with the documents stored. The program accepts requests in the form of a title of virtually unlimited size, and a number of keywords. The documents stored on magnetic tape are searched and the accession number and bibliographic data of each document satisfying a request are copied and stored. On completion of the search the appropriate request title is printed, followed by these data. Up to forty requests can be processed at a time; if more than this number are on the request tape the program will deal with the remainder after processing the previous forty requests.

The search process normally continues until all the documents stored on the magnetic tape have been inspected, but the search can be confined to material stored over a given period only. Keywords specifying a request are termed testwords and each request may have up to 16 testwords which have been ANDed together; this number can be exceeded when some of the testwords have OR operations performed on them. Before commencing the search the program prints the requests that have been accepted, thus making it possible to check that correct testwords have been punched and read into the computer. A retrieval printout, obtained when some 3000 documents only had been stored on magnetic tape, is shown Fig. 7. Essentially this consists of a list of IRRD accession numbers with limited bibliographic details.

### 5.4 From accession number to abstract

All IRRD information sheets (containing abstracts of published material) and research project sheets (containing abstracts of current road research) selected for inclusion in the RRL information system are microfilmed. Because only short lengths of film are used for each weekly input, the microfilm is unitized and inserted into a translucent acetate jacket in the form of microfiche.

From the computer printout of IRRD accession numbers the corresponding microfiche are examined on a 3M microfilm reader/printer for relevance, and a print obtained.

## 6. SERVICES AVAILABLE

### 6.1 Retrospective searches against specific enquiries

A request is processed as described above and the answer to an enquiry would normally be transmitted in the form of copies of relevant IRRD abstract sheets (see Fig. 1) obtained from the microfilm printer. It is considered that the quality of these prints is adequate for their purpose, namely to tell the enquirer what is available so that he can decide whether he wishes to consult the full document.

A large number of the documents included in the information system are in the RRL Library and can usually be borrowed by users of the information service if not available elsewhere. Photocopies can frequently be obtained from the National Lending Library at Boston Spa. The remaining

documents are held by one of the other two IRRD Co-ordinating Centres, Laboratoire Central des Ponts et Chaussées (LCPC) in Paris and Forschungsgesellschaft für das Strassenwesen (FG) in Cologne. The documents abstracted by the Highway Research Board (see. 7.1) are generally available only from the original source or from the U.S. Clearinghouse for Federal and Technical Information.

Enquiries posed by other IRRD member countries or by other organizations receiving IRRD sheets can be simply answered by supplying the IRRD accession numbers as printed out by the computer.

## 6.2 Current awareness service

A current awareness service, initially available on a limited basis, is included in the information service. A printout from the microfilm reader/printer of newly stored material on a regular basis according to a fixed 'profile' will be automatically distributed. The computer search is similar to the retrospect search but only those accessions stored between current awareness runs are searched. The search specifications, or profiles, are stored unchanged on tape until modified.

## 6.3 Road abstracts

The information service is at present supplemented by the monthly publication *Road Abstracts*, which contains a selection of abstracts of published articles included in the IRRD scheme. The future of this publication will be considered when the current awareness service is fully operational and widely available.

# 7. COMPATIBILITY WITH RELATED INFORMATION SYSTEMS

## 7.1 Relationship with HRIS

The Highway Research Board in Washington has its own Highway Research Information Service (HRIS) but works very closely with the IRRD through the Road Research Laboratory. All information (published material and current research) stored in the HRIS system is made available in the form of abstracts to IRRD through RRL and vice versa and both centres make their own selection.

One of the projects in hand is to develop a conversion code to convert index terms in the HRB thesaurus to the IRRD code and vice versa.

## 7.2 Other related information systems

The IRRD is now a well-established scheme for the exchange of information on an international level in the field of road and road transport research. The subject field embraces a number of disciplines and has points of contact with many fields, e.g. town planning, police law and the construction industry. Some national and international organizations have applied for associate membership of IRRD and will be exchanging abstracts with IRRD according to the principles adopted by IRRD. These organizations will develop a microthesaurus in their own field stemming from the appropriate terms in the IRRD thesaurus. The Co-ordinating Committee of the IRRD has therefore started the work of drafting a macrothesaurus from which microthesauri (i.e. thesauri containing index terms in depth within a given subject) can stem, with the aim of making for ease of exchange

of information in related fields.

## 8. FUTURE DEVELOPMENT

With the arrival of the English Electric 4/70 computer in mind the IRRD abstract sheets (see Figs 1 and 2) are prepared on a tapewriter, the Dura Mach 10. The tape is generated when the IRRD sheet is initially typed and this tape is used to prepare an author index card, the computer input, the camera copy for the photolitho production of *Road Abstracts*, and indexes.

A scale of charges for the service is under consideration.

## 9. SUMMARY

The information system described has been devised as a compromise between the time-consuming manual search and the highly complex systems calling for large costly computer storage. The system is designed to give the user relevant or near-relevant material leaving him to make the final choice of material he wishes to study further.

A system of feedback from the user is being included in an attempt to provide as nearly as possible the service that users want.

IRRD

FICHE DOCUMENT - INFORMATION SHEET - DOKUMENTATIONSBLATT

DIRR

1. TITRE DANS LA LANGUE DU RÉSUMÉ : TITLE IN THE LANGUAGE OF THE ABSTRACT : TITEL IN DER SPRACHE DES REFERATS :

British idea for a Danish bridge

26362  
NUMÉRO - NUMBER - NUMMER

2. TITRE - 2<sup>e</sup> LANGUE (Facultatif) : TITLE - 2nd LANGUAGE (Optional) : TITEL - 2. SPRACHE (Fakultativ) :

R

3. TITRE - 3<sup>e</sup> LANGUE (Facultatif) : TITLE - 3rd LANGUAGE (Optional) : TITEL - 3. SPRACHE (Fakultativ) :

R

4. AUTEUR (S) : AUTHOR (S) : VERFASSER :

ANON.

5. ÉDITEUR, SOURCE ET LIEU DE PUBLICATION : EDITOR, SOURCE AND PLACE OF PUBLICATION : QUELLENANGABE DER VERÖFFENTLICHUNG :

Engineering, London

4. ANNÉE 6. YEAR 6. JAHR	1967	MOIS MONTH MONAT	5	VOL. BAND	203	N <sup>o</sup> No. Nr.	5273	pp Pp SEITE	766	PHOT.	1	FIG.	1	TAB.	0	RÉF. BIBL. REFERENCES LIT.-ANG.	0	PRIX PRICE PREIS	-
--------------------------------	------	------------------------	---	--------------	-----	------------------------------	------	-------------------	-----	-------	---	------	---	------	---	---------------------------------------	---	------------------------	---

7. RÉSUMÉ ANALYTIQUE (et titre en langue originale si ce n'est pas une langue officielle) : ABSTRACT (and title in original language if different from official languages) : REFERAT (und Titel in der Originalsprache, falls nicht offizielle Sprache) :

A British proposal is described for a bridge to span the 10 miles across the Great Belt in Denmark. The idea employs a series of 150-m spans of twin precast, prestressed concrete box girders carried on portal piers, with each box girder carrying a railway track inside and three lanes of motorway on the top deck. A novel floating shutter has been devised for building the concrete piers.

8. SOURCE DU RÉSUMÉ : SOURCE OF ABSTRACT : HERKUNFT DES REFERATS : R.R.L.

MOTS-CLÉS/KEYWORDS/STICHWÖRTE	CODE/KENN-NUM.	MOTS-CLÉS/KEYWORDS/STICHWÖRTE	CODE/KENN-NUM.	TERMES ADDITIONNELS ADDITIONAL TERMS ZUSÄTZLICHE FACHWÖRTER
bridge	09.64			1
concrete	24.66			2
box girder	09.98			3
motorway	02.63			4
railway	08.26			5
precast	98.33			6
prestressed	98.31			7
bridge pier	09.40			8
				9
				10
				11
				12
				13
				14
				15
				16

TRADUCTION EN :  
TRANSLATION INTO :  
UEBERSETZUNG LIEGT VOR IN :

de :  
at :  
bei :

DIFFUSION : LIBRE   
CIRCULATION : OPEN   
VERTEILUNG : FREI

CHERCHEURS UNIQUEMENT  
RESEARCH ONLY  
NUR FORSCHUNG

REPRODUCTION INTERDITE  
NOT FOR PUBLICATION  
NICHT VERÖFFENTLICHEN

SERA PUBLIÉ DANS BULLETIN RÉSUMÉS ANALYTIQUES : NON   
WILL BE PUBLISHED IN ABSTRACT BULLETIN : NO   
SOLL IN DOKUMENTATION VERÖFFENTLICHT WERDEN : NEIN

OUI   
YES   
JA

PAR :  
BY :  
DURCH :

Denmark 94.27

Fig. 1. EXAMPLE OF A COMPLETED IRRD INFORMATION SHEET

**IRRD**

**FICHE PROJET - RESEARCH PROJECT SHEET - FORSCHUNGSARBEIT**

Fiche préparée par l'IRRD en collaboration avec l'IRF - Sheet prepared by OECD in collaboration with IRF - Verdruct van der OECD in samenwerking met de IRF opgesteld

1. INTITULÉ DE LA RECHERCHE / PROJECT TITLE / TITEL DER FORSCHUNGSARBEIT :  
**Aggregates in bituminous surfacings - behaviour under traffic.**

2. LABORATOIRE CHARGÉ DE LA RECHERCHE - ADRESSE / RESEARCH ORGANIZATION  
 IN CHARGE - ADDRESS / BEAUFTRAGTE STELLE :  
 Road Research Laboratory  
 Ministry of Transport  
 Crowthorne  
 Berkshire  
 England

3. CHERCHEUR (S) / RESEARCH TEAM / BEARBEITER :  
 G.F. Salt  
 J.R. Hosking

United Kingdom  
 PAYS / COUNTRY / LAND

R 27 039 | 35.060287  
 DIRR / IRRD | HRIS  
 NUMÉRO / NUMBER / NUMMER

4. FINANCEMENT PAR / SPONSOR / AUFTRAGGEBER :  
 Ministry of Transport

5. COUT / COSTS / KOSTEN :

TOTAL / GESAMT	ANNUEL / ANNUAL / JAERLICH
	£5 000 <small>Devises locales Local Currency Länderswährung</small>
	US \$

FICHE PROGRAMME N° / PROJECT NUMBER / Nr.

DATE DE DÉBUT / STARTING DATE / BEGINN

1970

FIN PRÉVUE POUR / ESTIMATED COMPLETION DATE  
 VORAUSSICHTLICHER ANSCHLUSS

TERMINÉ / COMPLETED / BEENDET

DATE / DATUM

DESCRIPTEURS PROPOSÉS / SUGGESTED DESCRIPTORS  
 VORGESCHLAGENE DESCRIPTOREN

6. BUTS POURSUIVIS / AIMS / AUFGABE (RÉSUMÉ / SUMMARY / REFERAT)

Full-scale road experiments have been constructed to provide data on the behaviour under traffic of aggregates in bituminous surfacings. The resistance to polishing and skidding is being studied.

The observations of the full-scale road experiments will continue and further experiments will be constructed as necessary.

7. ÉTAT D'AVANCEMENT A CE JOUR / PRESENT POSITION / STAND DER FORSCHUNGSARBEIT :  
 DATE / DATUM

Oct. 1965	75%
Jan. 1967	Active
May. 1968	Active

8. FICHE PRÉPARÉE PAR / SHEET PREPARED BY / AUSGESTELLT VON : RRL

Date / Datum : Oct. 1965

MOTS-CLÉS / KEYWORDS / STICHWÖRTER	CODE / KENN-NUM.	MOTS-CLÉS / KEYWORDS / STICHWÖRTER	CODE / KENN-NUM.	TERMES ADDITIONNELS / ADDITIONAL TERMS ZUSÄTZLICHE STICHWÖRTER
RESEARCH PROJECT	88.53			1
aggregate	23.62			2
bituminous mixture	26.75			3
road surface	06.31			4
behaviour	64.22			5
traffic density	50.36			6
skidding	59.50			7
full-scale	42.58			8
experiment	40.85			9 Great Britain 94.46
				10
				11

9. TITRE, AUTEUR(S) ET DATE DES RAPPORTS PUBLIÉS / TITLE, AUTHOR(S) AND DATE OF PUBLICATION OF REPORTS / TITEL, VERFASSER UND DATUM DER VORLIEGENDEN BERICHTE :  
 BROWN, J.R. An experiment comparing the performance of roadstones used as chippings in rolled asphalt. A.511, Derby ring road. RRL Report LR 63 (Crowthorne, 1967).  
 WILSON, D.S. An experiment comparing the performance of roadstone in surface dressing. A.40, West Wycombe, Bucks. RRL Report LR 46  
 HOSKING, J.R. An experiment comparing the performance of roadstones in different bituminous surfacings: A.30, Blackbushe, Hampshire. RRL Report LR 81 (Crowthorne, 1967).

N° FICHE-DOCUMENT-IRRD  
 No. OF IRRD INFORMATION SHEET  
 Nr. IRRD-DOKUMENTATIONSBLATT

25934

25175

28665

**DIRR**

Fig. 2. EXAMPLE OF A COMPLETED IRRD RESEARCH PROJECT SHEET

47.36	HUMIDITE	HUMIDITY	FEUCHTIGKEIT
*	*	* MOISTURE	*
*	*	* DAMPNES	* FEUCHTE
*	*	* DAMPNESS	*
47.38	CREPUSCULE	DUSK	* NAESE
*	*		DAEMMERUNG
*	*		* ZWIELICHT
47.40	PROTECTION	* TWILIGHT	*
47.41	NEIGE FONDANTE	PROTECTION	SCHUTZ
47.43	NEIGF GLISSANT	SLUSH	SCHNEEMATSCH
47.45	CLIMAT	SLIPPERY SNOW	SCHNEEGLAETTE
*	*	WEATHER	WITTERUNG
*	*		* KLIMA
47.47	BROUILLARD	* CLIMATE	*
*	*	FOG	NEBEL
*	*	* MIST	*
*	*	* HAZE	*
*	*	* SMOG	*
47.49	NUIT	NIGHT	NACHT
47.50	PARAVENT	WINDSCREEN	WINDSCHUTZ
47.51	BARRIERE	FENCE	SPERRE
47.52	NEIGE	SNOW	SCHNEE
47.53	CONGERE	SNOW DRIFT	SCHNEEWEHUNG
*	*		* VERWEHUNG
47.54	VENT	WIND	WIND
*	* EOLJEN		*
47.56	CHAUFFAGE DES ROUTES	ROAD HEATING	STRASSENHEIZUNG
47.57	ANTIGEL	ANTIFREEZE	FROSTSCHUTZMITTEL
47.58	HEURE	HOOR	STUNDE
47.59	JOUR	DAY	TAG
47.61	PAR-NEIGE	SNOW FENCE	SCHNEEZAUN
47.64	TEMPETE	STORM	STURM
*	*	* LIGHTNING	*
47.66	VERGLAS	GLAZED ICE	GLATTEIS
47.72	CHASSE-NEIGE	SNOW PLOUGH	SCHNEERAUMER
47.75	HIVER	WINTER	WINTER
*	*	* COLD WEATHER	*
47.77	CYCLE GEL-DEGEL	FREEZING - THAWING CYCLE	FROST - TAU - WECHSEL
47.79	INONDATION	FLOODING	UEBERSCHWEMMUNG
*	* CRUE		*
47.82	CHASSE-NEIGE A TURBINE	SNOW BLOWER	* UEBERFLUTUNG
			SCHNEESCHLEUDER

FIG. 3. SAMPLE PAGE TAKEN FROM THE IRRO NUMERICAL THREE-LANGUAGE THESAURUS

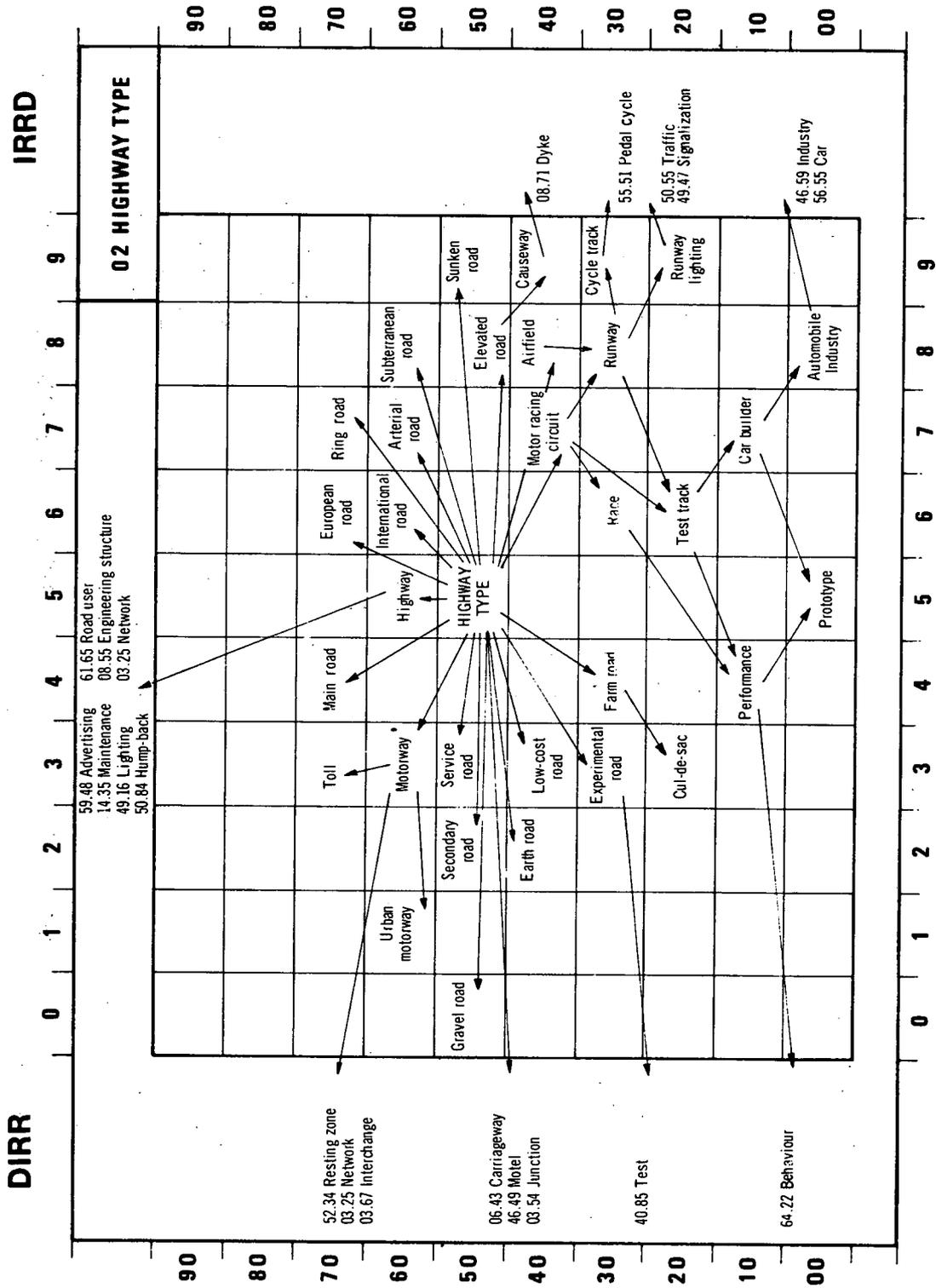


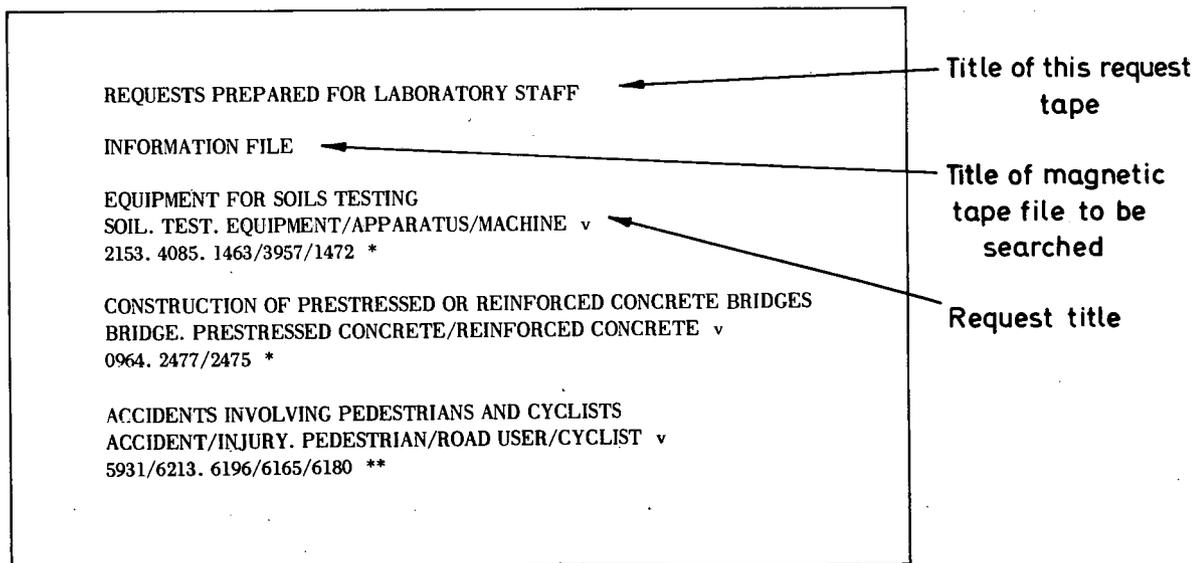
Fig. 4. DIAGRAM TAKEN FROM IRRD THESAURUS SHOWING ARROWS LINKING KEYWORDS THAT CORRESPOND TO RELATED IDEAS TO HELP THE INDEXER SELECT APPROPRIATE KEYWORDS

**INFORMATION FILE**

3051	5525	4646	4647	4656	8929	4613	9526	*	
1965	93	2384	14-6	MOD. TRANSP.	HELLEWELL. D.S.			v	
3052	5525	4646	4647	8645	8969	9770	6777	4633	9596 *
1965	93	2385	14-5	MOD. TRANSP.	HELLEWELL. D.S.			v	
3053	5546	5503	5557	4085	5983	8624	0214	9706	9481 *
1965	93	2384	17	MOD. TRANSP.	BELSHAW. M.K.			v	
3054	6752	3355	2123	7926	8027	9783	2121	4329	3474
3482	2153	8007	4306	*					
1965	125	3793	30-3	SURVEYOR. LOND.	KOLBUSZEWSKI. J.			v	
3055	5952	6213	1497	6171	5931	5940	6261	4054	6162
5655	*								
1965	1	5429	236	BRIT. MED. J.	COWEN. P.N.			v	
3056	3658	4085	2153	2121	3431	3625	4091	3427	6700
6754	3655	3947	*						
1965	2	1	40-52	CAN. GEOTECH. J.	KONDNER. HORNER			v	
3057	4603	4656	4655	5055	8660	9845	0265	5039	0565
0367	8955	*							
1965	92	3	108-18	J. INSTN. MUNIC. ENGRS.	MACKAY. JAMIESON			v	

\* denotes end of keywords  
v denotes end of bibliographic data

**Fig. 5. PRINTOUT OF PORTION OF TYPICAL STORAGE TAPE  
BIBLIOGRAPHIC DETAILS ARE IN THE FORM YEAR,  
VOLUME NUMBER, ISSUE NUMBER AND FIRST AND  
LAST PAGE NUMBERS**



v denotes end identifier of one request  
\* denotes end of keywords  
\*\* denotes end of requests

**Fig. 6. PRINTOUT OF REQUEST TAPE**

REQUESTS PREPARED FOR LABORATORY STAFF

INFORMATION FILE

LAST UP DATED 17. 10. 65  
MIN. ACC. NO. 1703  
MAX. ACC. NO. 4321

EQUIPMENT FOR SOILS TESTING  
SOIL. TEST. EQUIPMENT/APPARATUS/MACHINERY  
2153. 4085. 1463/3957/1472 .

CONSTRUCTION OF PRESTRESSED OR REINFORCED CONCRETE BRIDGES  
BRIDGE. PRESTRESSED CONCRETE/REINFORCED CONCRETE  
0964. 2477/2475

ACCIDENTS INVOLVING PEDESTRIANS AND CYCLISTS  
ACCIDENT/INJURY. PEDESTRIAN/ROAD USER/CYCLIST  
5931/6213. 6196/6165/6180

25.11.65  
EQUIPMENT FOR SOILS TESTING  
SOIL. TEST. EQUIPMENT/APPARATUS/MACHINERY  
2153. 4085. 1463/3957/1472  
3062 1965 91 SM 1 53-62 PROC. AM. SOC. CIV. ENGRS.  
3072 1965 43 506 37-43 RDS. RD. CONSTR.

25.11.65  
CONSTRUCTION OF PRESTRESSED OR REINFORCED CONCRETE BRIDGES  
BRIDGE. PRESTRESSED CONCRETE/REINFORCED CONCRETE  
0964. 2477/2475  
3010 1965 60 1 5-10 CONCR. CONSTR. ENNG.  
3019 1965 203 4466 459 CONTRACT. J.  
3117 1965 30 489-530 PROC. INSTN. CIV. ENGRS.

25.11.65  
ACCIDENTS INVOLVING PEDESTRIANS AND CYCLISTS  
ACCIDENTS/INJURY. PEDESTRIAN/ROAD USER/CYCLISTS  
5931/6213. 6196/6165/6180  
NO. DOC. FOUND

END OF DATA  
XX

Repeat of  
request data

Fig. 7 TYPICAL RETRIEVAL PRINTOUT: IRRD ACCESSION NUMBER FOLLOWED BY BIBLIOGRAPHIC DETAILS IN THE FORM YEAR, VOLUME NUMBER, ISSUE NUMBER AND FIRST AND LAST PAGE NUMBERS (ONLY 3000 DOCUMENTS HAD BEEN STORED IN 1965 WHEN THIS EXPERIMENTAL PRINTOUT WAS OBTAINED)

## ABSTRACT

**RRL Computer-aided technical information service:**  
P. E. Mongar: Ministry of Transport, RRL Report LR 177: Crowthorne, 1968 (Road Research Laboratory). The design and operation of the Road Research Laboratory technical information service which is now available, is described. The storage and retrieval system adopted is a compromise between a fully computerized system requiring large computer storage and a tedious manual system. The main feature of the system is its simplicity.

The Laboratory's computer is being used for the time-consuming search to identify relevant documents. From then on an abstract of each document is scanned on a microfilm reader/printer and a print of a relevant abstract is immediately available.

The Report describes how the input is obtained, the nature and selection of material stored, and the storage and retrieval procedures for a current awareness service and for retrospective retrieval.

No scale of charges for the service has been fixed because the computer at present is shortly to be replaced.

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