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(BARS) – Bibliographic Retrieval System Sandia Shock Compression (SSC) Database Shock Physics Index (SPHINX) PC/DOS Version 4.0

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(BARS) - BIBLIOGRAPHIC RETRIEVAL SYSTEM*

Sandia Shock Compression (SSC) Database

Shock Physics Index (SPHINX)

PC/DOS Version 4.0

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ABSTRACT

The Bibliographic Retrieval System (BARS) is a database management system specially designed to retrieve bibliographic references. Two databases are available, i) the Sandia Shock Compression (SSC) database which contains over 5600 references to the literature related to stress waves in solids and their applications, and ii) the Shock Physics Index (SPHINX) which includes over 6200 further references to stress waves in solids, material properties at intermediate and low rates, ballistic and hypervelocity impact, and explosive or shock fabrication methods. There is some overlap in the information in the two data bases.

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Bibliographic Retrieval System (BARS)

User's Guide

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INTRODUCTION

The Bibliographic Retrieval System (BARS) is a database management system specially designed to retrieve bibliographic references. Two databases are available, i) the Sandia Shock Compression (SSC) database which contains over 5600 references to the literature related to stress waves in solids and their applications, and ii) the Shock Physics Index (SPHINX) which includes over 7500 further references to stress waves in solids, to material properties at intermediate and low rates, ballistic and hypervelocity impact, and explosive or shock fabrication methods. There is some overlap in the information in the two data bases.

The databases are particularly useful in locating openly published information regarding the dynamic behavior of materials under impact, explosive, or pulsed radiation which have to a very wide variety of defense and industrial applications, including ballistic and space debris penetration, explosive demolition and excavation, accident analysis, and various materials processing methods like powder compaction metallurgy, forging and upsetting, and explosive forming, hardening, welding, perforating, material synthesis, etc.

The SSC database was originally developed by J. R. Asay, D. E. Grady, R. A. Graham, and M. E. Kipp of Sandia National Laboratories, and C. E. Anderson, J. S. Wilbeck, and J. C. Hokanson of Southwest Research Institute [1,2]. Its initial implementation used INGRES on DEC VAX computers [3]. The data have been corrected and transposed to the present PC/DOS version by T. Parker of Re/Spec Inc. A reprogrammed INGRES version is also available for many computer platforms. see page 12. The SSC represents 3 man-years of effort.

The SPHINX database was developed by W. Herrmann of Sandia National Laboratories and K. Mulholland of Career Services of New Mexico in a PC/DOS version, and has been extensively revised and corrected by T. Parker. The SSC has also been transposed to an INGRES version, see page 12. It also represents 3 man-years of effort.

The BARS system uses a run-time module of the askSam program* to retrieve bibliographic information using flexible Boolean search criteria based on author names, affiliations, countries, year of publication, keywords, or words contained anywhere in the records, including titles. Retrieved references may be sorted in a variety of ways, for example by author and year, by affiliation and author, etc.

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Output may be viewed on the screen, sent to a printer, or stored in a file in one of several output formats. The simplest formats include abbreviated and full ASCII listings of the contents of the records. Formatted output suitable for input to the LaTeX typesetting program may also be obtained, and short LaTeX programs are included to produce one and two column listings. It is also possible to obtain output in BiBTeX format. With minor editing, this may then be included in TeX manuscripts to produce professionally formatted reference lists. The TeX system itself is not included, but may be purchased separately from one of several commercial suppliers.

It is also possible to add to the SSC or SPHINX or to construct new databases using a separately purchased copy of the full askSam program.

BASIC OPERATION

System Requirements

The BARS system operates on IBM PC, XT, AT, PS/2 or compatible running DOS 3.0 or higher with a minimum of 341K memory and a hard disk. SPHINX and/or SSC are best run on a 386 or faster machine with 640K memory. Speed is greatly enhanced by the availability of expanded memory for a large disk cache or a 4 Mbyte RAM disk. Installation requires 10,523 Kbyte of free space on a hard disk. After installation, the files occupy 9,645 Mbyte on the hard disk. Video systems which are supported include monochrome, MDA, Hercules, CGA, EGA, and VGA.

Quick Start

BARS/SPHINX/SSC files are provided in compressed form on two 1.2 Mbyte 5.25 inch or two 1.44 Mbyte 3.5 inch diskettes, which also contain compressed forms of the run time version of askSam and several ancillary programs. To install, insert Diskette 1 into drive A:, make A: the current drive, and type

INSTALL A C

The install program will create a subdirectory on the C: drive named C:\SBRS, copy the files on the diskette to this subdirectory and uncompress them. It will then request that diskette 2 be inserted into the A: drive, copy those files and uncompress them. The install program will then erase the compressed source files. If you wish to install from a different diskette drive, substitute the drive letter for A:. If you wish

to install to a different hard disk, substitute the drive letter for C:. For other installations, see "Installation Notes".

Running Bars

Following installation, to run BARS change to the subdirectory where BARS has been installed (C:\SBRS), and type

BARS

Alternatively, move the file BARS.BAT from the BARS subdirectory to a subdirectory in your DOS path. You may then start BARS from any subdirectory. If BARS has been installed on a different hard drive or moved to another subdirectory, edit BARS.BAT to include the appropriate path. Once BARS has been started, the opening screen will be displayed. Press ENTER to start. The main menu will be displayed.

Database Structure

Both SPHINX and SSC contain one bibliographic reference per data record. The information is entered into different fields. Field names are always ended with an opening square bracket. Fields common to both SPHINX and SSC are:

ACCESS#	
AUTHOR	AFFILIATN
TITLE	YEAR
KEYWORDS	NOTES

In SSC, one additional field contains the bibliographic reference, without the publication year which is in YEAR. In SPHINX, the bibliographic reference is divided into separate fields, depending on the kind of publication, that is, journal article, book, conference proceedings, technical report, thesis, or miscellaneous.

The common fields are carefully structured, as described below:

ACCESS# [This numeric field contains a unique accession number used to identify the document. It is allocated to the document on data entry, may be used to sequentially file the physical copies of the documents themselves, and is retired when a document is removed from the database.

AUTHOR[Author names are given as the surname followed by a comma and initials. If there are more than one author, names must be separated by semicolons which are used as delimiters. Care has been taken to check for consistent spelling and initials. Chinese author names are given in full in the Chinese order, family name followed by full given name, wherever possible. A glossary of author names is provided in files SSCAUTH.TXT and SPHAUTH.TXT for SSC and SPHINX, respectively, which may be listed or imported into a word processor for printing.

AFFILIATN[Institutional affiliations of authors are given together with the country, in the same order as the author names, again separated by semicolons if there are more than one author. Care has been taken to give the institutional names in a consistent manner. A glossary of affiliations is given in files SSCINST.TXT and SPHINST.TXT for SSC and SPHINX, respectively.

TITLE[Contains the title of the reference.

YEAR[Contains the year of publication.

KEYWORDS[Keywords have been assigned to many of the references to aid in retrieval. They are again separated by semicolons used as delimiters. Assigning keywords in a consistent manner is inherently difficult. For SPHINX, a relatively small fixed glossary of hierarchical keywords is used, which is included in the file SPHKEYW.TXT.

NOTES[This field is provided to note library accession numbers, ordering information, language and translation information, location of the physical document, to whom lent, due date, or any other relevant information. It is often empty.

Main Menu

The main menu provides choices for the database to be queried, for entry of the retrieve criteria, sort criteria and output format. These choices are saved for subsequent queries.

The main menu also provides the choice to view retrieved records on the screen, to print them, or to save them in a specified file. Since choices are saved, it is possible to view some or all of the retrieved records on the screen to determine if the retrieve or sort criteria are satisfactory, and then to print or save the results to file.

Upon exiting BARS, the choices may be saved for the next execution of BARS, system default choices may be restored, or BARS may be exited without saving choices.

In each case, choices may be made by moving the highlight to the appropriate line using the arrow keys and pressing <Enter>, or by pressing the indicated letter key.

Select Database

Choice of "Select Database" will bring up a menu with the choices SPHINX, SSC or OTHER. Select the appropriate line with the arrow keys and press <Enter> or press the appropriate letter key. The file must be an askSam file with extension .ASK. The system default is SPHINX. The choice OTHER brings up a dialog box asking for the desired file name without extension which must be the name of an askSam file with default extension .ASK.

Enter Retrieve Criteria

It is possible to search the databases for individual words, or Boolean combinations of words in any field. Boolean operators must be enclosed in chain brackets. Wild cards * representing any number of characters and ? representing one character are allowed. It is also possible to restrict searches to specified fields in the data records, the most useful of which are AUTHOR[, AFFILIATN[, TITLE[, KEYWORDS[. For example:

Jones	Single author name
Jones {AND} Smith	Both must be in the record
Jones Smith	{AND} is implied if omitted
Jones {OR} Smith	Found if either are present
Jones {NOT} Smith	Found if Smith is not present
Jones {IN} AUTHOR[	Restricted to given field
Sandia {IN} AFFILIATN[	Affiliation search
France {IN} AFFILIATN[	Country search

It is also possible to perform comparisons on numeric fields, namely YEAR[and ACCESS#[. For example:

```
YEAR[ = 1980
YEAR[ < 1980
YEAR[ > 1980
YEAR[ > 1970 {AND} YEAR[ < 1981
```

Word and numeric searches may be combined in Boolean expressions. Boolean expressions may be constructed up to 77 characters. They are read from left to right, and no grouping is allowed. Boolean and comparison operators must always be preceded and followed by spaces.

The data files have been indexed, and it is possible to perform index searches on the following fields: AUTHOR[YEAR[ACCESS#[. No Boolean expressions are allowed in the index search, but additional retrieve criteria may follow the index search criterion. For example:

{INDEX Jones}	{INDEX Jones} Smith
{INDEX Jones} YEAR[> 1980	{INDEX Jones} {NOT} Smith
{INDEX 1980} Jones Smith	{INDEX 1234}

Index searches are much faster. In some cases, accession numbers may coincide with years, and an index search will retrieve both.

Enter Sort Criteria

Retrieved entries may be sorted on any of the common fields. More than one sort field name may be entered, the sort being performed in order of the field names. For example:

AUTHOR[	YEAR[
YEAR[AUTHOR[	AFFILIATN[YEAR[AUTHOR[

The system default is YEAR[. In order to sort in descending order, use :D in front of the field name. For example:

:D YEAR[	AUTHOR[:D YEAR[
:D AUTHOR[YEAR[	:D YEAR[:D AUTHOR[

Enter Output Format

Choice of "Enter Output Format" will bring up a menu with four choices. Select the appropriate line with the arrow keys and press <Enter> or press the appropriate letter key. The system default is SHORT. The four ASCII output formats are:

SHORT This is most useful. The authors, title, reference and year of publication are listed, followed by the accession number in brackets. If sent to file, the ASCII output may be imported into any word processor. In this connection, some editing is usually required to replace semicolons in the list of authors with commas and "and".

LONG This format provides an image of the data records, exactly as they are included in the data base. It is principally useful to see all the field names and data in records.

TEX This format is intended for input to the TeX typesetting program. It is often convenient to view retrieved entries on the screen in SHORT format, and then to change to TEX format before the data are sent to a file.

In the TEX format, each record is preceded by a macro name (`\refrnce`), followed by five arguments consisting of the author names, title, full reference, accession number, and keywords. Two ancillary TeX files are provided to provide typeset listings: TWOCOL.TEX for two column listings; and ONECOL.TEX for one column listings. These files, when run with the TeX program, set page and type sizes and other defaults, define the macro (`\refrnce`) and input the file OUT.TXT, which is the default output file name provided by BARS. Experienced TeX users may edit TWOCOL.TEX or ONECOL.TEX to change this filename and may redefine the macro (`\refrnce`) to provide typeset output in any desired format. TeX experts may also be able to incorporate the ASCII output from BARS directly into their manuscripts.

BIB This format is intended for use by the BiBTeX program for constructing lists of references for manuscripts typeset by the TeX program. It is necessary to use a text editor to replace all semicolons in the author names with "and". It is also necessary to provide each record with an identifying label which will be used as labels in the TeX manuscript. Refer to TeX and BiBTeX documentation for more information.

View Records on Screen

Selecting VIEW on the Main Menu will display the records on the screen, using the previous choices for the database to query, retrieve criteria, sort criteria, and output format. The most useful output format is the SHORT format, although the others may be used to preview the results.

Print Records

Selecting PRINT on the Main Menu will send the records to the printer, using the previous choices for the database to query, retrieve criteria, sort criteria, and output format. The most useful output format is the SHORT format.

Send Records to File

Selecting FILE will bring up a dialog box requesting the desired file name. The records will be written to the current subdirectory using the previous choices for the database to query, retrieve criteria, sort criteria, and output format. The default is OUT.TXT. It is also possible to specify a drive letter preceding the file name in the dialog box. Preceding the path and file name with :A and a space will append the output to an existing file of the same name.

Exit Bars

Selecting EXIT will bring up a menu with choices to save the current selections, restore system default selections, or BARS may be exited without saving current selections. In each case, execution of BARS will end.

ADVANCED TECHNIQUES

Editing and Adding Records

It is possible to edit and add records to either the SSC or SPHINX data bases using a separately purchased copy of the full askSam program. The data bases are contained in askSam formatted files named SSC.ASK and SPHINX.ASK, which were copied into the SBRS subdirectory during installation, and which are used by the BARS program. Start the askSam program and specify which of these files are to be used. The full features of askSam may then be used to retrieve, delete, edit, and add records.

For adding records, askSam provides ten key templates, the first six of which are used by BARS for different types of publications as follows:

Alt-F1	Journal Article
Alt-F2	Book
Alt-F3	Conference Proceedings
Alt-F4	Technical Report
Alt-F5	Thesis
Alt-F6	Miscellaneous

Use the proper template and enter the relevant information in appropriate fields. Be extremely careful to avoid misspellings or alternate forms of author names, affiliations, and keywords, else these will not be retrieved properly. Use the files SSCAUTH.TXT,

SPHAUTH.TXT, SSCINST.TXT, SPHINST.TXT, and SPHKEYW.TXT as glossaries. Also avoid misspelling titles. It is advantageous to be very consistent with journal and conference names, and any other information in the records.

It is strongly recommended that the original SSC.ASK and SPHINX.ASK files be saved permanently as backups before altering them in any way. Then it is always possible to reinstall SSC or SPHINX from the original distribution diskettes.

Creating Other Databases

It is possible to create separate data bases of your own bibliographic references with the BARS formats, using a separately purchased copy of the full askSam program. Start askSam and specify either SSC.ASK or SPHINX.ASK. Select CREATE from the askSam main menu and specify a suitable name. Then select SPAWN INITIAL PROGRAMS. This will create an empty file, but with all the BARS defaults, key templates, and program records. You may then enter your own data using ADD and the key templates.

If you have constructed your own database, it may be used with BARS. From SELECT DATABASE, specify OTHER. Then provide the name of your own database in the dialog box.

Creating Glossaries

Included in the SSC.ASK and SPHINX.ASK files and any files you spawn from them are askSam program records to send listings of author names, affiliations, and keywords to ASCII files. Start the full version of askSam with either SSC or SPHINX, choose EXECUTE from the main menu, and enter :AUTHOR, :AFFIL, or :KEYWD to obtain contents of author fields, affiliation fields, or keyword fields for each record in files AUTHOR.INP, AFFIL.INP, or KEYWD.INP, respectively. Of course, since the entire contents of the relevant field in each record is output, these files will contain semicolons used as delimiters and have many repetitions. A small executable program USORT.EXE is provided to separate entries at delimiters, sort the result alphabetically, and eliminate duplicate entries. From the SBRS subdirectory, at the DOS prompt type USORT. The program will ask for the input file name, say AUTHOR.INP, and the output file name, say AUTHOR.OUT. The ASCII output may be viewed, printed, or imported into any word processor for formatted printing.

Speed Considerations

It is much faster to perform index searches. For the fastest search always use the word or number which is likely to appear least often in the indexed fields AUTHOR[, YEAR[, and ACCESS#[, followed by other retrieve criteria.

If expanded memory is available, speed may be greatly enhanced by a disk cache of 2 Mbyte or more.

For the fastest speed, use a 4 Mbyte RAM disk, to which either SSC or SPHINX has been copied. Also copy BARS.ASK, BARS.BAT, and RT.EXE to the RAM disk. If you expect a large output file, specify a hard drive with the file name, for example, C:out.txt, unless you can afford a big enough RAM drive to accommodate the output file as well. Do not forget to copy the output file to your hard disk before turning off the computer.

Installation Notes

Distribution diskette 1 contains the following files
README.TXT MANUAL.BAT INSTALL.BAT MANUAL.TXT SSC.EXE
while distribution diskette 2 contains the file SPHINX.EXE. The first four are ASCII files, while the last two are self extracting compressed files containing the BARS programs and data. Copy the files from both diskettes to a separate subdirectory of your choice. Then execute SSC.EXE and SPHINX.EXE which will uncompress the files. The space required on the hard disk is 11,655 Kbyte. SSC.EXE and SPHINX.EXE may then be deleted to save 2,296 Kbyte. You may wish to customize BARS.BAT to include a disk and directory change to the directory in which you have installed BARS, and to move BARS.BAT to a directory in your DOS path so that BARS may be started from any directory.

Composite Databases

It is possible to sequentially retrieve references from SSC, SPHINX, and any of your own bibliographic files created as outlined on page 9, combine the output, and produce sorted listings of the composite result. Or, it is possible to retrieve references from one database, using different retrieve criteria in separate steps, subsequently using additional retrieve and sort criteria on the composite output. It is necessary to write one or more intermediate data files to accomplish such tasks.

To start, use BARS with appropriate retrieve criteria to write an output file, say TEMP.TXT. Be sure to use the LONG output format so that complete images of the data records are output. Now use BARS with other retrieve criteria or with other databases. However, be sure to specify :A TEMP.TXT for the filename so that the new data are appended to the same output file. Now exit BARS and start a full version of askSam with either SSC or SPHINX. Select CREATE from the main askSam menu, specify a suitable file name, and specify SPAWN INITIAL PROGRAMS to create a new askSam database, as outlined on page 9. Select IMPORT from the main askSam menu, and specify your temporary filename, TEMP.TXT. The settings should be

Line Terminator	"end of line"
End of record delimiter	"20 lines"
Prevent split paragraphs	"off"
End of document delimiter	"single line"

Then select PROCEED WITH IMPORT. The file TEMP.TXT will be read into askSam. It is then possible to use BARS with this new composite data file, specifying additional retrieve and sort criteria and appropriate output formats. The imported file will be saved with the file extension .ASK on exit from askSam.

askSam has many powerful features which you may use with the SSC, SPHINX, or your own databases. However, be sure to save the original versions of SSC and SPHINX so that they may be restored in case they are inadvertently altered or erased.

SOFTWARE AVAILABILITY

A copy of the PC/DOS version of BARS/SSC/SPHINX may be obtained by applying to the Director, Energy Science and Technology Software Center, PO Box 1020, Oak Ridge, TN 37831-1020. A copy of INGRES version of BARS/SSC/SPHINX is available from the same source for use with INGRESS version 6.0 or higher, which will run on a large variety of computer platforms. Specify the desired media in your request.

REFERENCES

- [1] C. E. Anderson, J. S. Wilbeck, J. C. Hokanson, J. R. Asay,, D. E. Grady, R. A. Graham and M. E. Kipp, "Sandia Shock Compression Database", Shock Waves in Condensed Matter, ed. Y. M. Gupta, Plenum Press, pp 185-190, (1985)
- [2] J. S. Wilbeck, C. E. Anderson, J. C. Hokanson, J. R. Asay, D. E. Grady, R. A. Graham and M. E. Kipp, "The Sandia Computerized Shock Compression Bibliographic Database". Metallurgical Applications of Shock Wave and High Strain Rate Phenomena. eds. L. E. Murr, K. P. Staudhammer and M. A. Myers, Dekker, pp 357-367 (1985)
- [3] M. E. Kipp, D. E. Grady, J. R. Asay and R. A. Graham, "User Guide to the Sandia Shock Compression Database", Sandia National laboratories Report SAND88-2933, December, (1988).

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