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REPAIR, EVALUATION, MAINTENANCE, AND REHABILITATION RESEARCH PROGRAM

TECHNICAL REPORT REMR-CS-27

USER'S GUIDE: MAINTENANCE AND REPAIR MATERIALS DATA BASE FOR CONCRETE AND STEEL STRUCTURES

by

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DEPARTMENT OF THE ARMY
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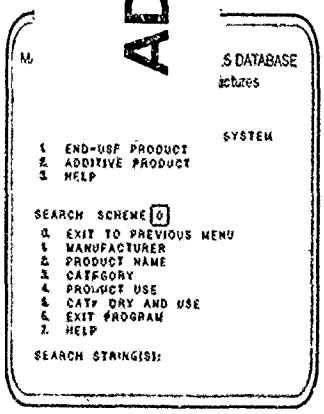

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COVER PHOTOS:

TOP — Data base network

CENTER — Data base queries

BOTTOM — Continuing data base maintenance

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The data base provides Corps of Engineers' personnel with a single point of access for the identification and selection of concrete and steel repair products. It contains manufacturer, Corps of Engineers, and other Federal and state agencies information and data regarding the use, application, limitation, and technical properties of the products.

The user can enter the data base, search for information needed, display results of search, and exit the system. The data base can be accessed at telephone number (601) 634-4223 through a remote personal computer and modem using a telecommunication package to dial and communicate with the host computer located at the US Army Engineer Waterways Experiment Station.

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PREFACE

The work described in this report was authorized by Headquarters, US Army Corps of Engineers (HQUSACE), as part of the Concrete and Steel Structures Problem Area of the Repair, Evaluation, Maintenance, and Rehabilitation (REMR) Research Program. The work was performed under Work Unit 32272, "Evaluation of Existing Maintenance Materials and Methods," for which Mr. Richard L. Stowe, US Army Engineer Waterways Experiment Station (WES), Structures Laboratory (SL), Concrete Technology Division (CTD), was Principal Investigator. Dr. Tony C. Liu (CECW-EG) was the REMR Technical Monitor for this work.

Mr. Jesse A. Pfeiffer, Jr. (CERD-C) was the REMR Coordinator at the Directorate of Research and Development, HQUSACE; Mr. James E. Crews (CECW-OM) and Dr. Liu served as the REMR Overview Committee; Mr. William F. McCleese (CEWES-SC-A), WES, was the REMR Program Manager. Mr. James E. McDonald (CEWES-SC-R), WES, was the Problem Area Leader.

The work was performed at WES, and this report was prepared by Messrs. Stowe and Roy L. Campbell, Sr., SL, CTD, under the general supervision of Messrs. Bryant Mather and James Ballard, Chief and Assistant Chief, SL, respectively, and Mr. Kenneth Saucier, Chief, CTD. The report was published by the Information Technology Laboratory, WES.

Commander and Director of WES was COL Larry B. Fulton, EN. Technical Director was Dr. Robert W. Whalin.

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CONVERSION FACTORS, NON-SI TO SI (METRIC) UNITS OF MEASUREMENT

Non-SI units of measurement used in this report can be converted to SI (metric) units as follows:

Multiply	By	To Obtain
inches	25.4	millimetres
pounds (mass)	0.4536	kilograms

USER'S GUIDE
MAINTENANCE AND REPAIR MATERIALS DATA BASE
FOR CONCRETE AND STEEL STRUCTURES

PART I: INTRODUCTION

1. The Maintenance and Repair Materials Data Base for Concrete and Steel Structures was needed to facilitate the identification and selection of repair products. The data base was developed to provide Corps of Engineers personnel with a single point of access for information on products available in the United States. To provide a more informed selection, the data base was designed to include information from three sources: manufacturer, Corps of Engineers, and other Federal and state agencies. The data base, when initially placed into service, had more than 835 products containing manufacturers' information. Available Corps technical data, case histories, and new product entries are being added as part of the continuing maintenance of the data base. Previously, the data base user had to contact a variety of sources to compile a list of applicable products from which to evaluate and select.

2. The repair materials data base is intended to provide the user with a means to: (a) identify products for use in concrete and steel structures that may be applicable for specific types of repairs and (b) obtain supplemental information from the manufacturer, the Corps of Engineers, and other sources regarding the use, application, limitations, and technical properties of the products. The data base is located and maintained at the Waterways Experiment Station (WES), Vicksburg, MS. It can be accessed at telephone number (601) 634-4223 through a remote personal computer and modem using a telecommunication package to dial and communicate with the WES host computer.

3. The user can enter the data base, search for information needed, display results of search, and exit the system. Data displayed on a monitor screen can be printed by pressing the shift and print screen (prt scr) keys on the keyboard. All user operations are menu driven. The written and displayed documentation, respectively, in this user's guide and on the display screen, is intended to be easily understood by those who are not professional programmers or operators. This user's guide contains instructions on the use of

the data base and examples of searches that can be performed. For questions concerning the use of the data base, plese contact:

Mr. Roy L. Campbell, SC-CA
Data Base Manager
US Army Engineer Waterways Experiment Station
3909 Halls Ferry Road
Vicksburg, MS 39180-6199
Telephone (601) 634-2814

4. Throughout this user's guide, there are words, numbers, symbols that appear capitalized and inserted between a less than and a greater than sign. These special notations denote keys on your keyboard labeled with these literary terms (i.e. RETURN, ?, etc.). On some keyboards the <RETURN> key is the same as the <ENTER> key.

5. Many prompts throughout the data base are Yes/No (Y/N) type questions and can be satisfied with uppercase or lowercase entry.

6. The user's guide includes pictures of the screens to make it easier for the user to identify where he or she is in the data base. Part II provides a quick overview of the data base system.

PART II: DATA BASE COMPONENTS

Product Identity

7. The products in the data base are identified as either end-use or additive. An end-use product is a material that is used as purchased to make a repair; whereas, an additive product is a material used in an end-use product. The end-use products portion of the data base contains products for maintenance and repair of concrete, steel, or both. The additive products portion of the data base contains only products that are portland cement admixtures or polymer cements.

8. Product categories identify, for end-use products, the basic material type of the product and, for additive products, the basic type of end-use material for which the product is an additive. The PRODUCT USES identify the type use(s) for which the product is applicable. Keywords and definitions of keywords for product category and use fields are provided in Appendix A.

Data Base Network

9. Figure 1 illustrates the hardware that makes up the corporate communication network. Modems and telephone lines link the remote user's personal computer (PC) with the host computers at WES. Two host PC's allow simultaneous use of the data base. An automatic roll-over device provides the user access to one or the other host PC. If PC No. 1 is in use, then PC No. 2 is connected if available. If both are in use, the user must wait.

Telecommunication Parameters

10. Telecommunication parameters required here are:

Baud Rate:	1,200	Parity:	None	Emulate:	VT-100
Data Bits:	8	Duplex:	Full	Telephone:	(601) 634-4223
Stop Bits:	1				

Program Structure

11. Figure 2 illustrates in simplified form the data base structure.

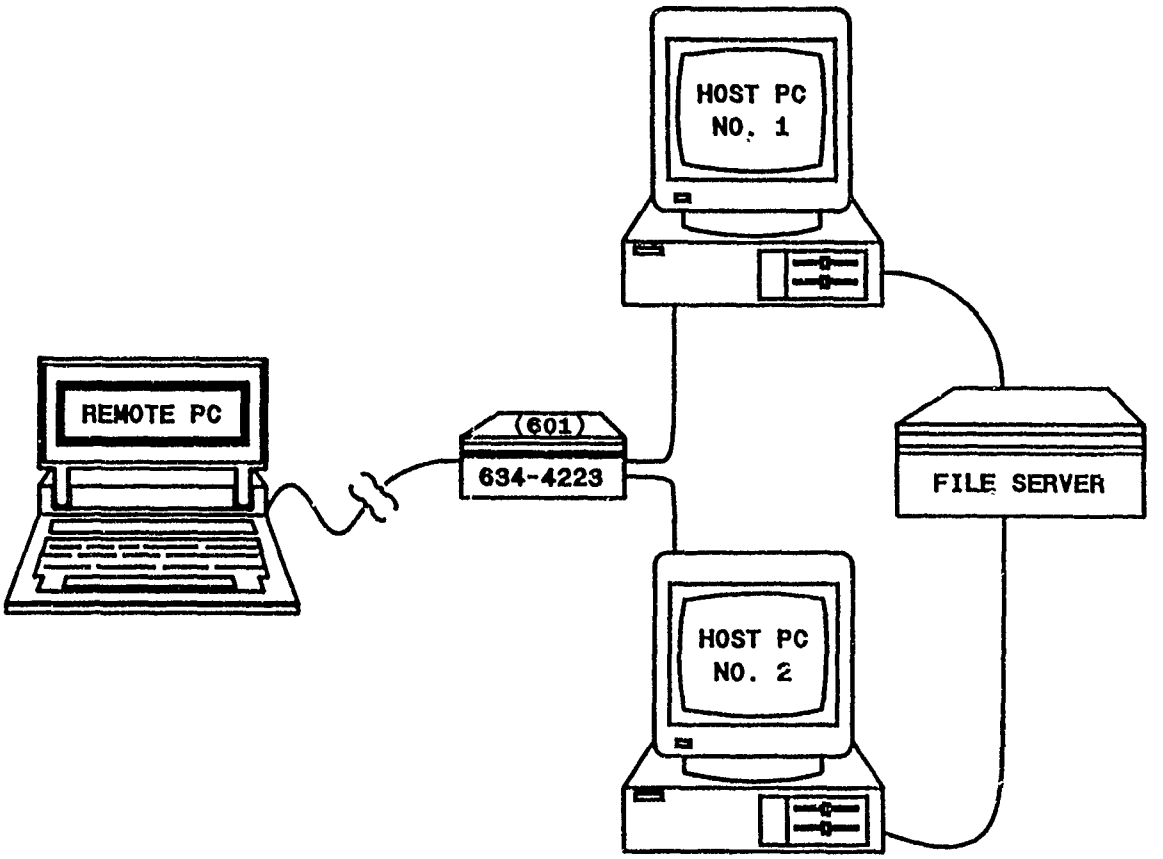


Figure 1. Data base network

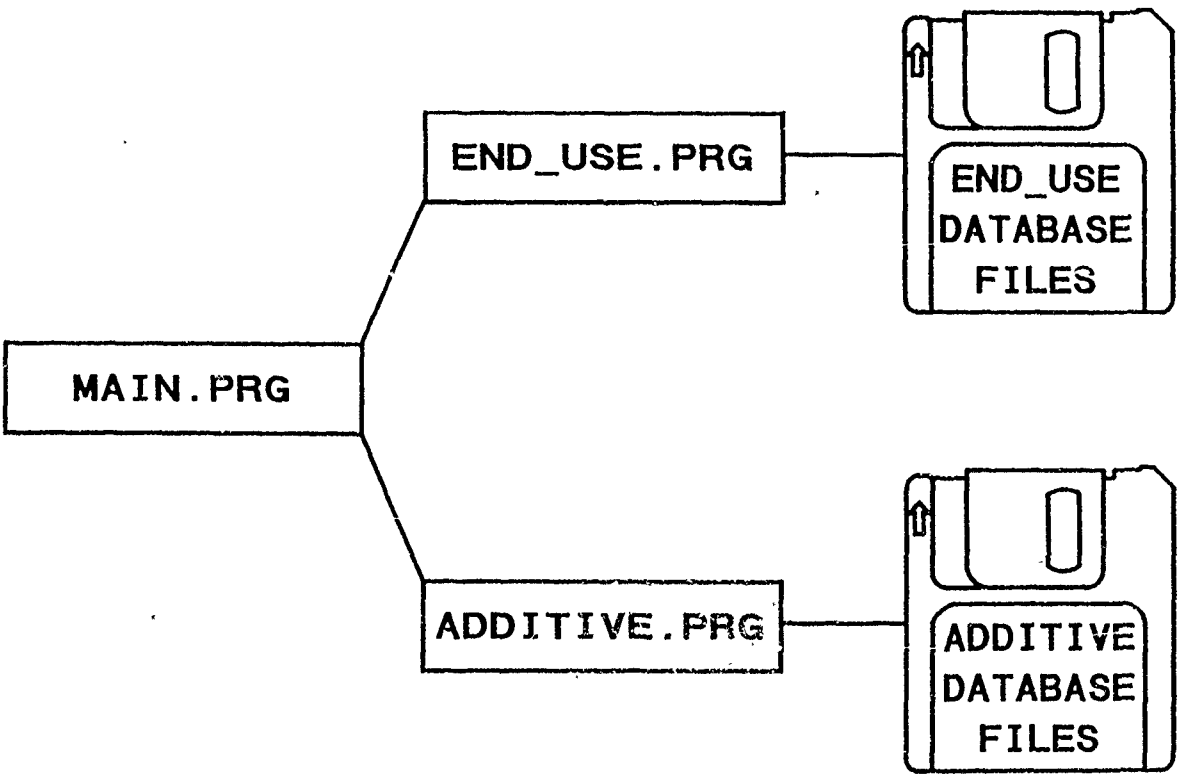


Figure 2. Data base structure

After accessing the main program, the user selects END-USE PRODUCTS or ADDITIVE PRODUCTS to search. As many as seven different data files for both types of products can be accessed for product information. For end-use or additive products, the following data base files can be accessed.

CORPS_TECH	Corps of Engineers Technical Data
CORPS_HIST	Corps of Engineers Use and Application Data
OTHERS_TECH	Other Federal and State Agencies' Technical Data
OTHERS_HIST	Other Federal and State Agencies' Use and Application Data
MANU_GEN	General Manufacturers' Information
MANU_APPL	Manufacturers' Application Information
MANU_TECH	Manufacturers' Technical Data

Search Scheme

12. The user must first select the data base to be searched, end-use or additive. The data base selected can then be searched, as illustrated in Figure 3, for product records having a specific MANUFACTURER'S NAME, PRODUCT NAME, PRODUCT CATEGORY, PRODUCT USE, or both product CATEGORY and USE. The number of records that contain data matching the specified query entry is displayed on the computer screen. The names of matched products can be listed on the screen or the user can view product data for all matched records, sequentially in order found. Should the user choose not to look at all matched records, he can view data for a selected product by making another search using the query for PRODUCT NAME. Data for other matched products can be retrieved and viewed in the same manner. Data can be printed and saved as displayed by pressing the <SHIFT> and <PRT SC> keys.

Query Responses

13. Query responses for manufacturer and product names are limited to a null () entry to return to search scheme menu or a character string entry to initiate search. For CATEGORY AND USE queries, responses are a null () entry to return to search scheme menu, a question mark (?) to display search words, or a character string to initiate search. The character string can be the exact search phrase (UNDERWATER REPAIR MATERIAL) or an unique string from the

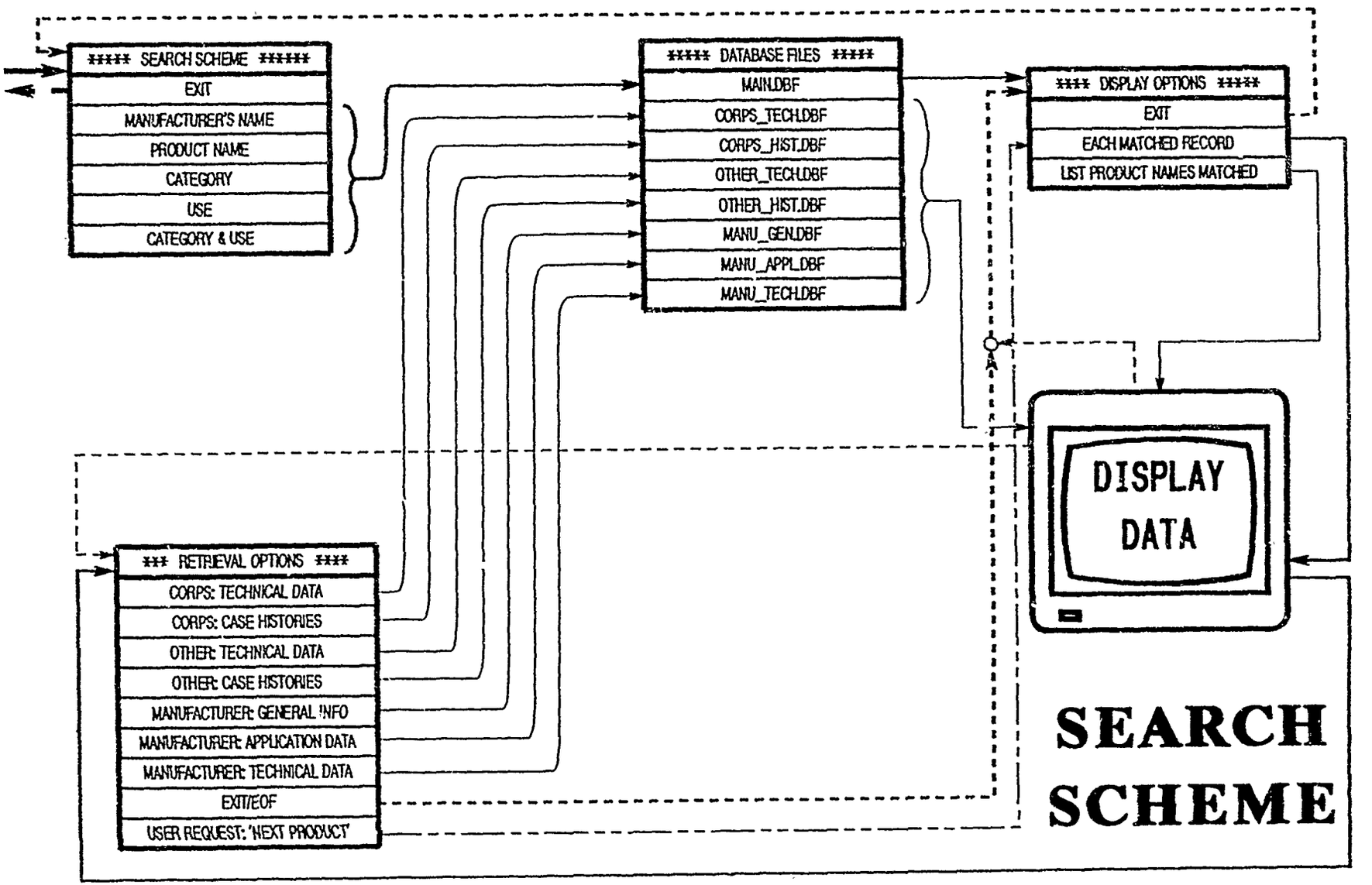


Figure 3. Flow chart illustrating search of product data base

phrase (UNDE). If more than one string is to be used in a search, a comma is used as a delimiter between strings. EPOXY,ACRYLIC entered as a response to the category query for END-USE PRODUCTS would find all records in which the category description contained the word EPOXY and the word ACRYLIC, regardless of the order and number of words in the description. The same results could be achieved if EPOX,ACRY had been entered because of the uniqueness of the words being found. The user is encouraged to use nonword strings for ease of entry; a minimum of four characters is required.

14. Records for products used to repair steel are found only through searches of uses for END-USE PRODUCTS in which the use is a coating or paint. Use descriptions for coatings will be COATING (CONCRETE), COATING (STEEL), and COATING (CONCRETE/STEEL). To search for a coating for concrete, the query response would be COAT,CONC; for steel, COAT,STEEL; and for both, COAT,CONC, STEEL. The same type searches would also be used for paints. All other END-USE PRODUCTS, except for STEEL REBUILDING MATERIAL, are for repair of concrete and do not contain the word CONCRETE in the description for product use.

Program Exit

15. The recommended way to exit the data base is to select the 0 (zero) option for each menu and press <ENTER> key for the query "Are You Sure You Want to Quit (Y/N)?," with Y being the default. Note that the 0 option is default for all menus except the RETRIEVAL OPTION menu. From all other menus and queries, exit the program by repeatedly pressing the <ENTER> key for each.

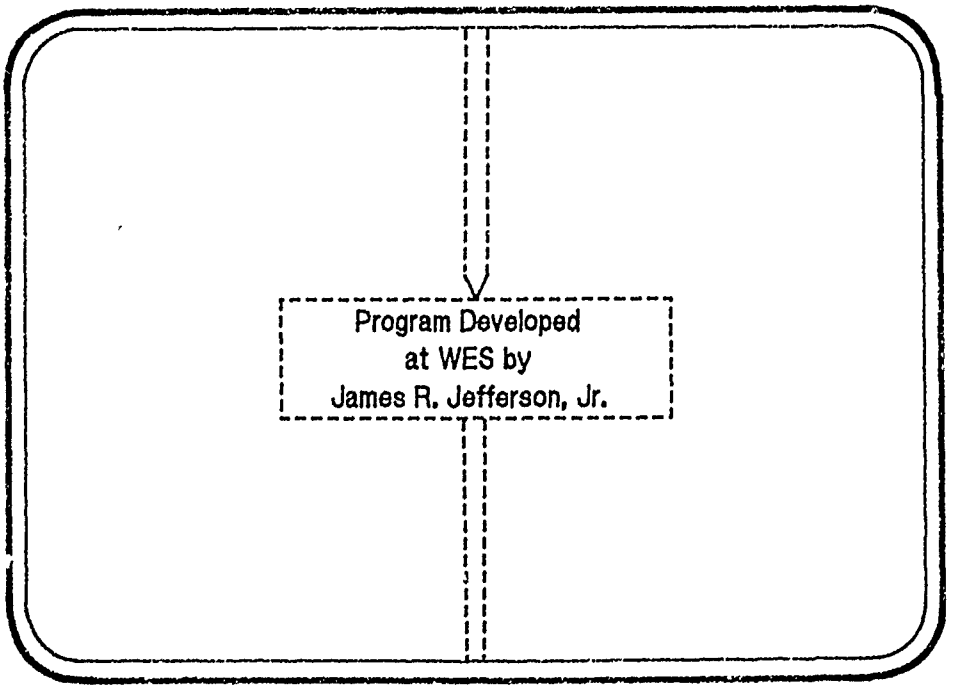
PART III: USING THE DATA BASE

16. Examples of searching the data base are given in the following paragraphs. PRODUCT NAME and PRODUCT USE are the most likely search schemes that a repair specialist would use in searching the data base. You should know the name of a repair product or its use. For a damaged area, such as a spall located in a horizontal surface of a floor, slab, or deck, the use of a repair product would be as a PATCHING MATERIAL for a HORIZONTAL SURFACE. Hence, PATCHING MATERIAL, HORIZONTAL SURFACE would be the PRODUCT USE you would use to search the data base.

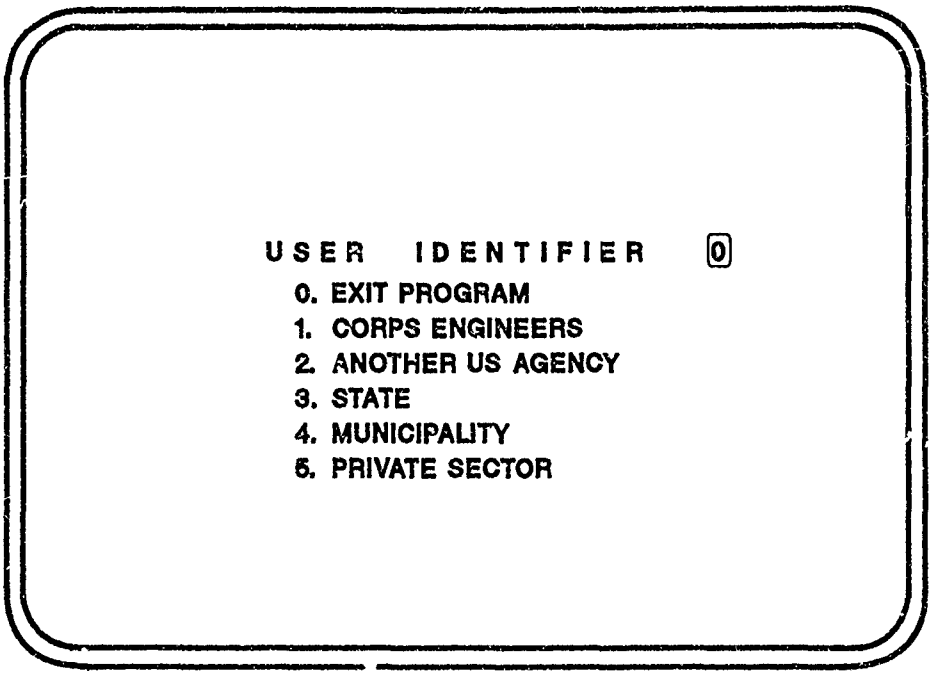
Search by Product Name

17. Let us assume you have the name of a concrete repair product that might be adequate to repair a spalled ar a in the deck of a parking garage. The product is a rapid repair material called Gilco Highway Patch. You know nothing more about the product, but you want to search the data base for a listing and any additional information available.

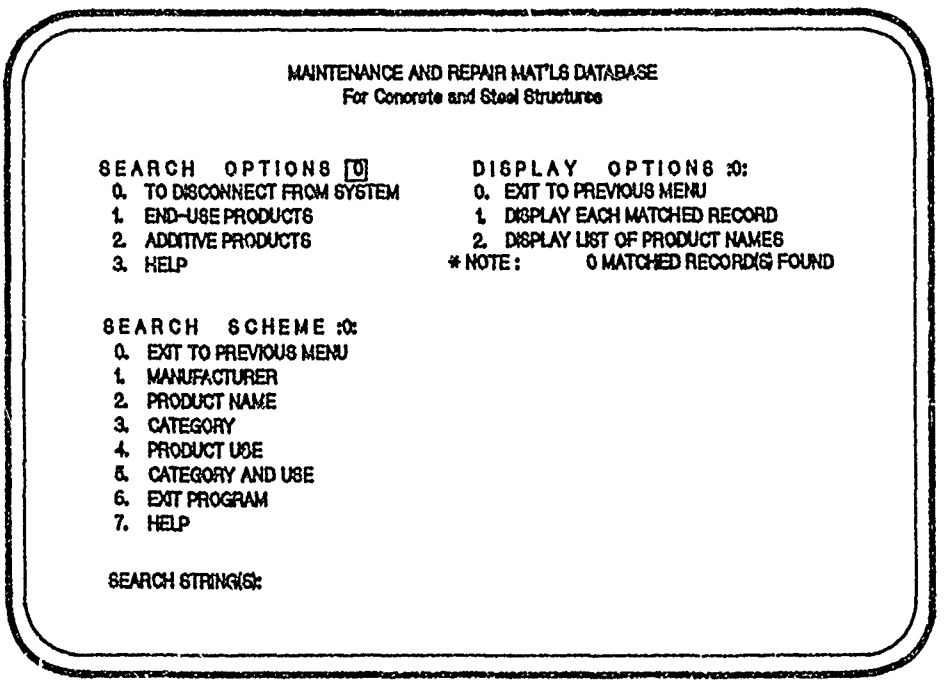
18. Use your telecommunication package (see Telecommunication Parameters for setup) to access the data base (phone number (601) 634-4223). When connected, the following screen will be displayed while the data base is loading for use; this normally takes 8 to 10 sec. The text bordered with lines denotes monitor screen display.



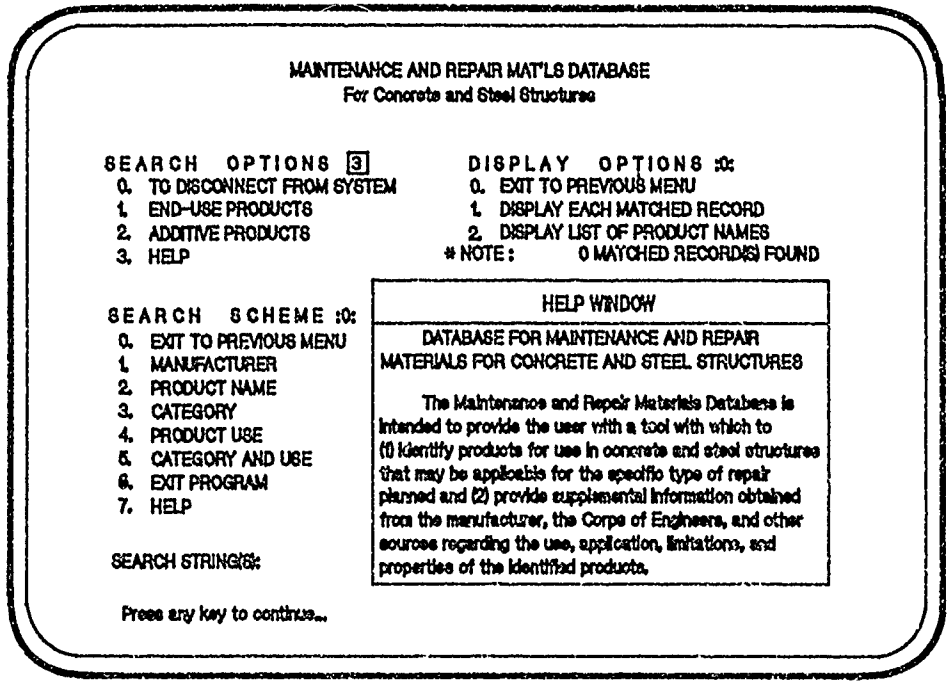
19. The USER IDENTIFICATION menu will appear when the data base is loaded and ready to use.



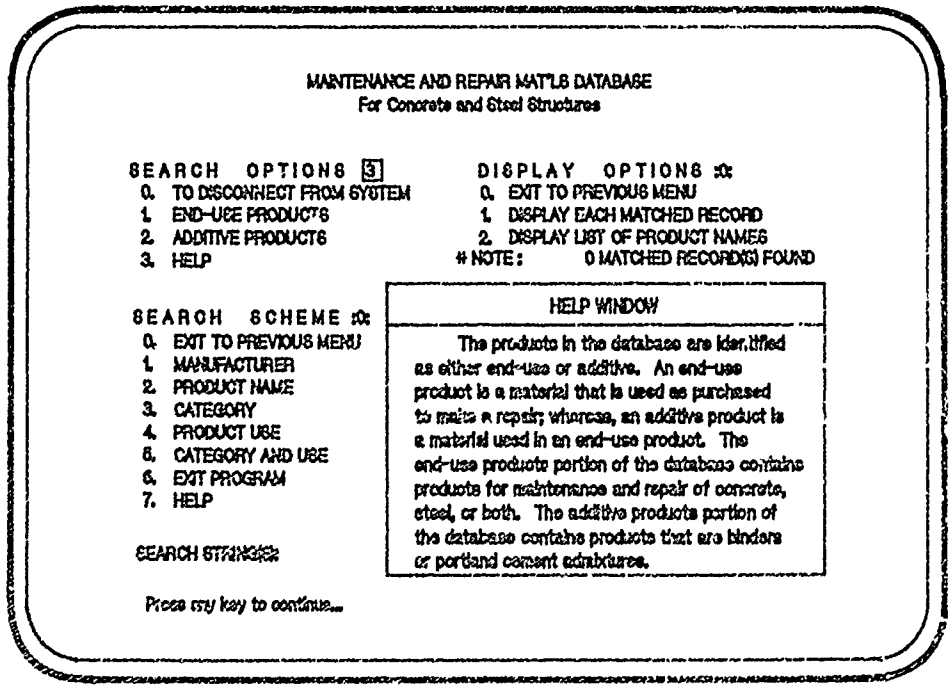
Press the proper <ID number> and <ENTER> key, and a three-menu screen will appear.



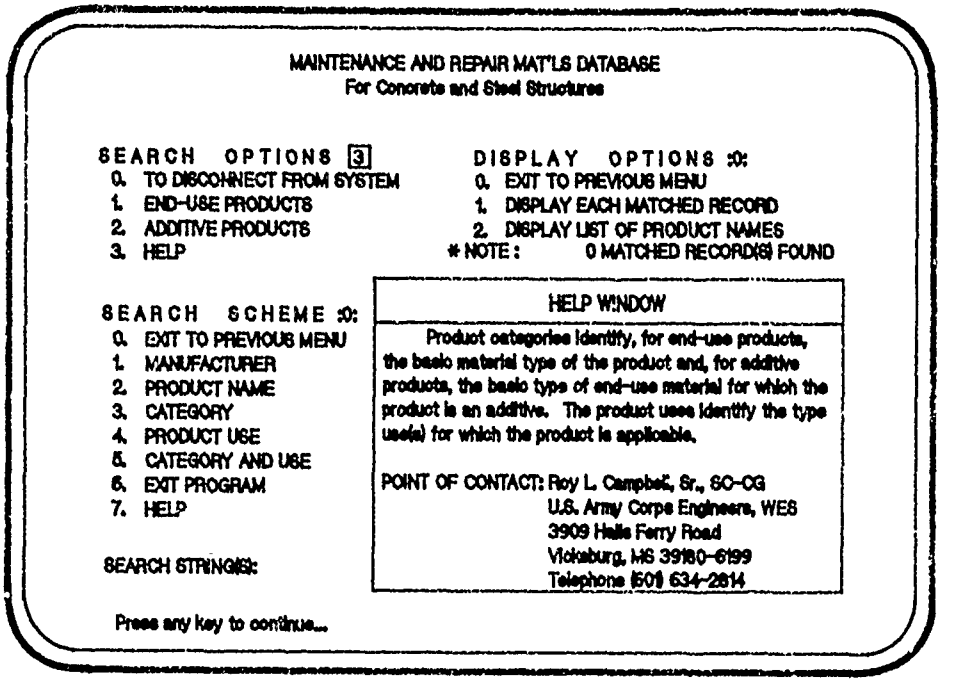
20. From the SEARCH OPTION menu, you may select options 0 through 3. In the Product Identity section, paragraphs 7 and 8 of this guide, products in the data base are identified as end-use or additive. If you have a question concerning the type of the Gilco Highway Patch product, press the <3> and <ENTER> keys and the help statement will appear in the window located at the bottom right quadrant of the screen; your question can be answered here, possibly. This particular help statement has been used in paragraphs 2, 7, and 8 of this guide, but is presented here to show the content of a help option.



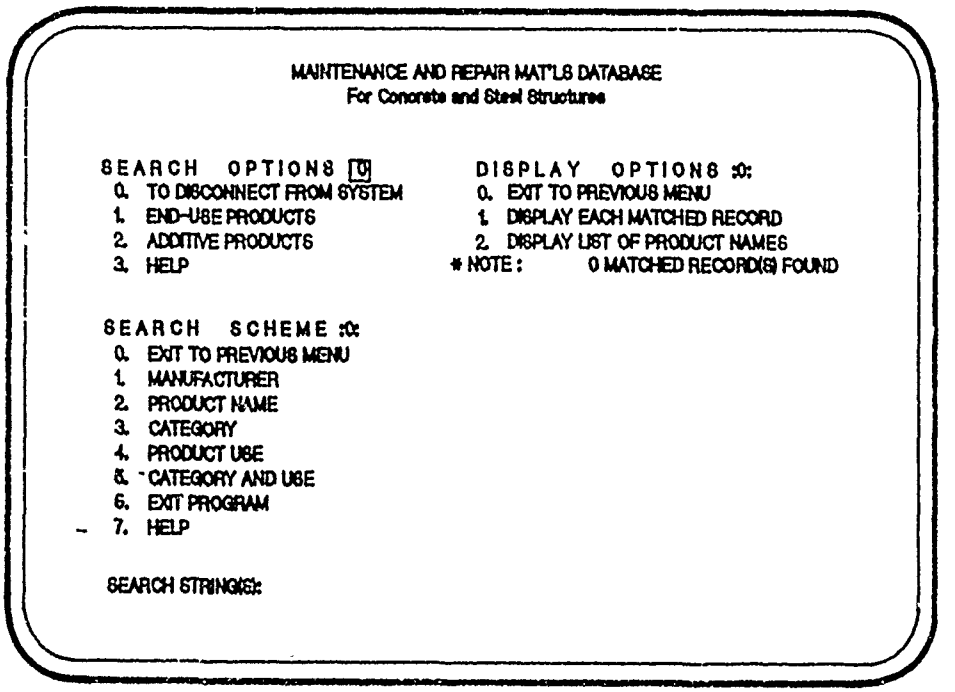
21. Press any key and the next help screen will appear in the window.



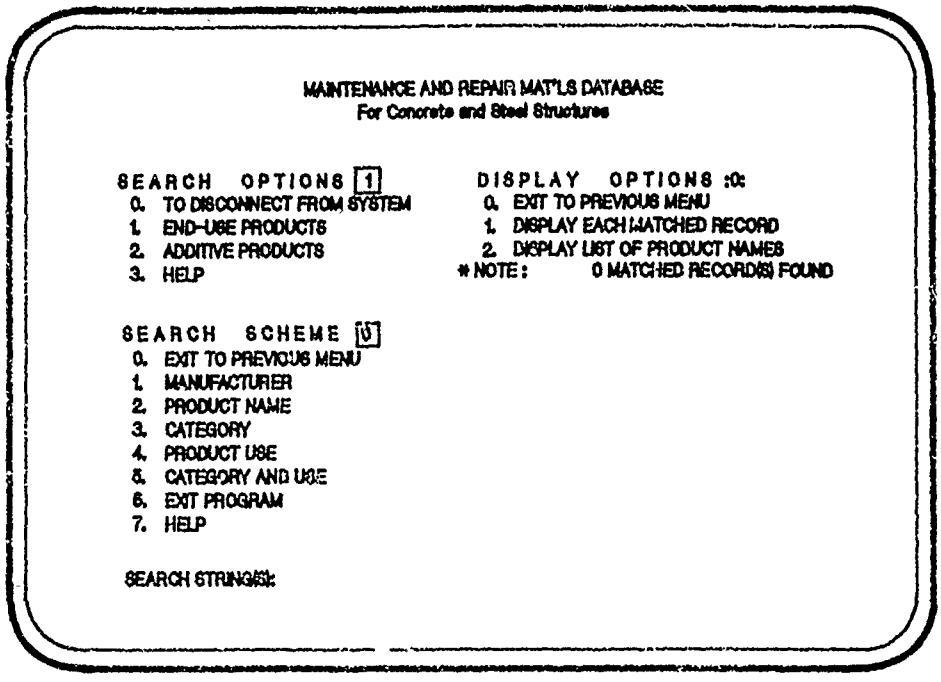
22. You have determined that Gilco Highway Patch is an END-USE PRODUCT and you are ready to proceed with the data base search. Press any key and the last help screen will appear.



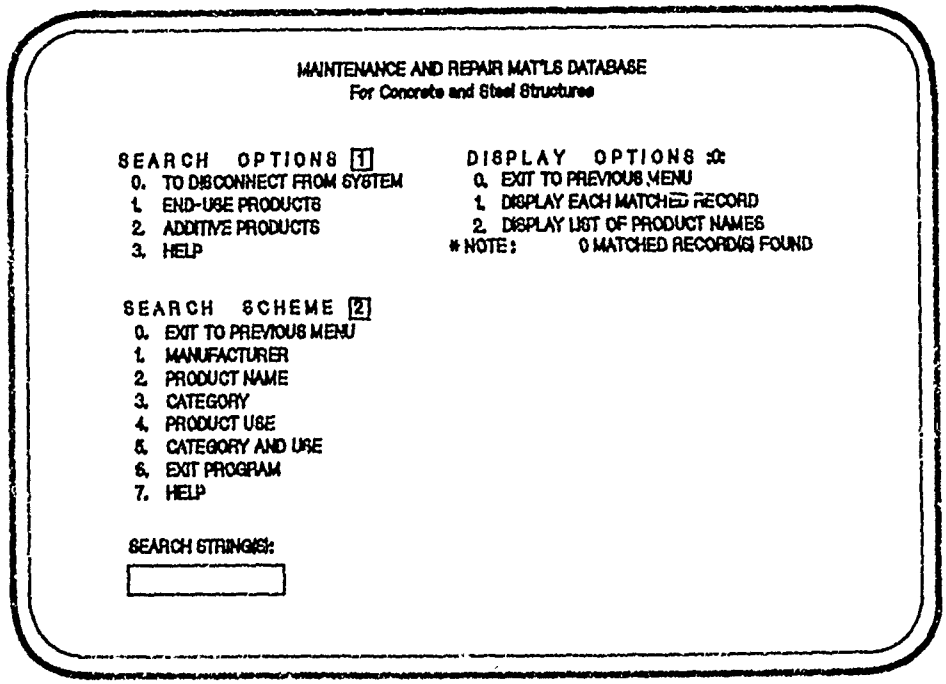
23. Press any key again, and the entry block for the SEARCH OPTIONS menu will be highlighted.



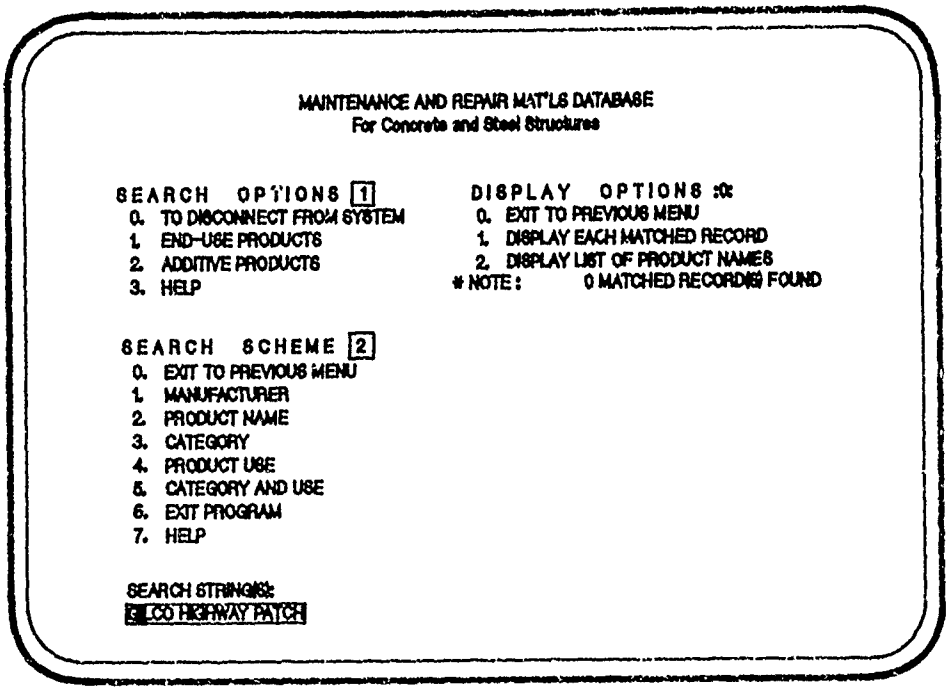
24. Press the <1> and <ENTER> keys to continue your search; the entry block for the SEARCH SCHEME menu will be highlighted.



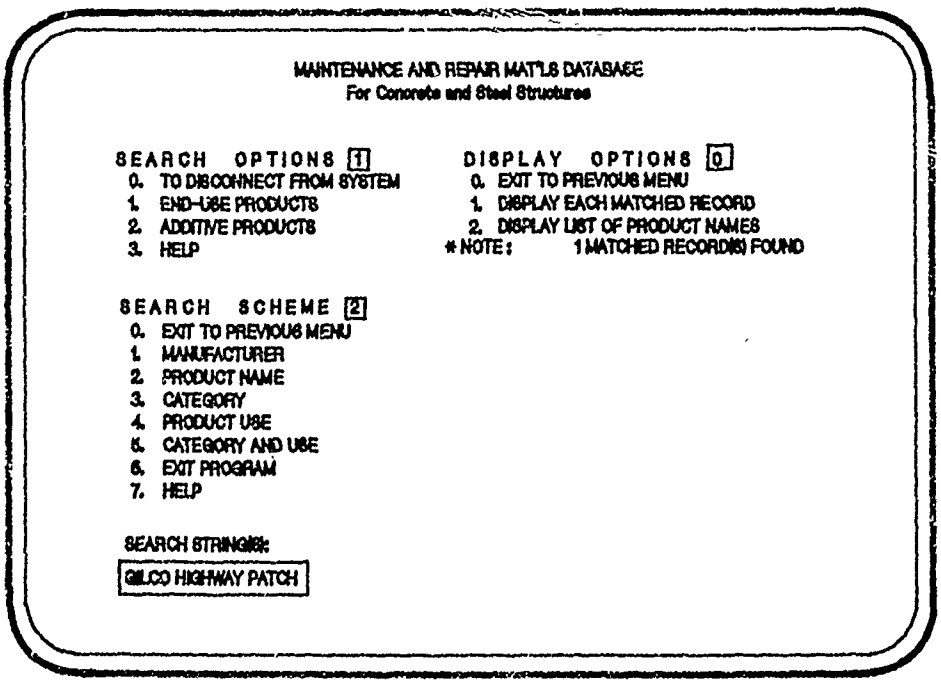
25. Press the <2> and <ENTER> keys to search by PRODUCT NAME and the entry block for SEARCH STRING(S) will be highlighted.



26. Type in "Gilco Highway Patch" to get:

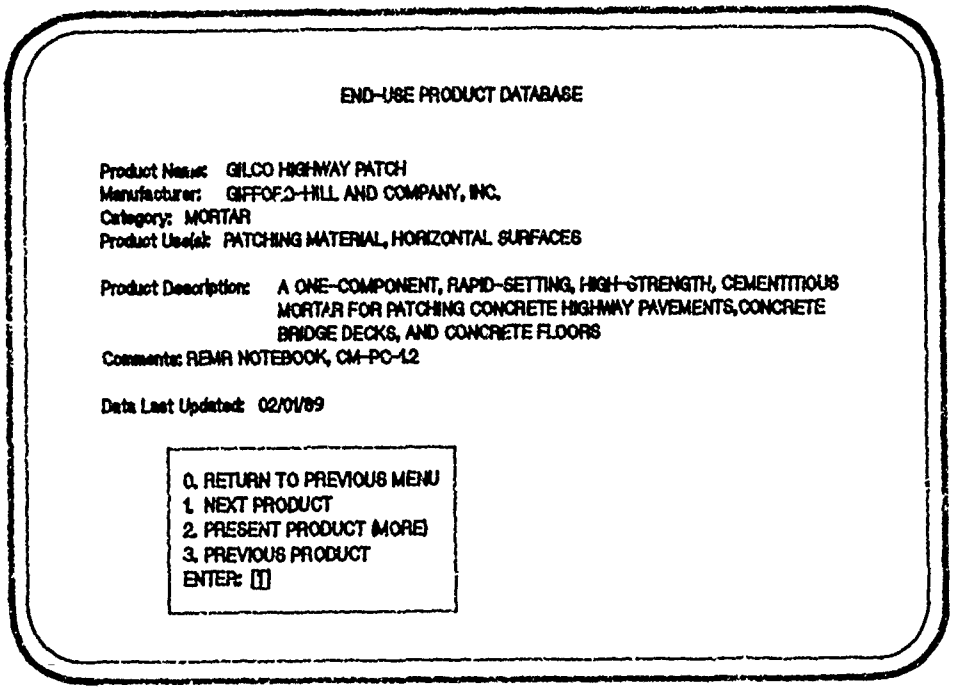


27. Press <ENTER> key and wait, allowing search time for a listing of this product; when that search is complete, the entry block for the DISPLAY OPTIONS menu will be highlighted.

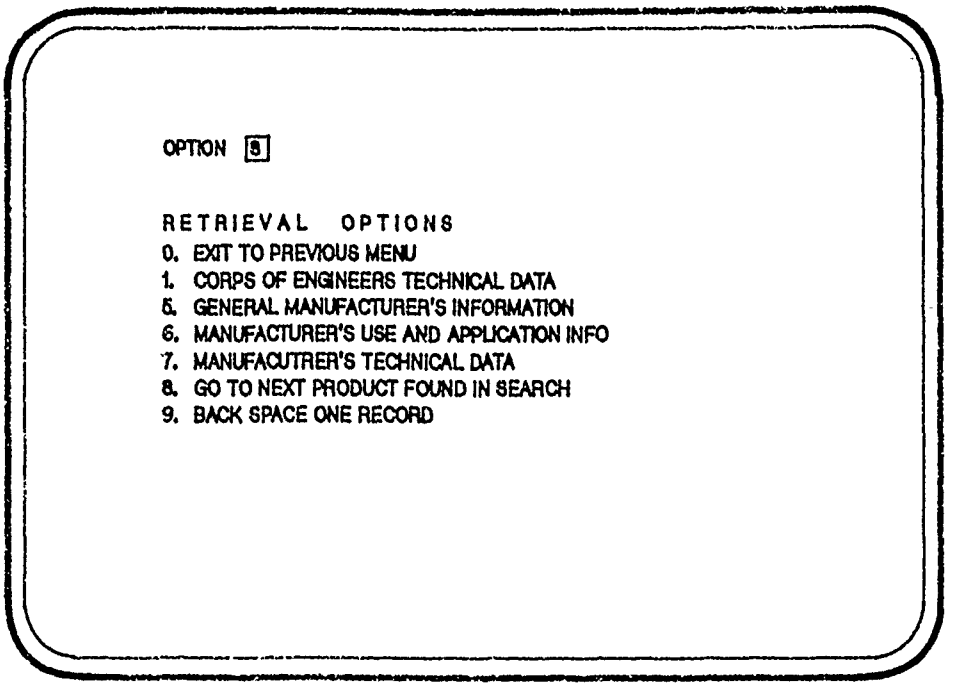


28. By pressing the <1> and <ENTER> keys, limited product information, such as product use, category, and description, will be obtained and will reduce search time. If, from this limited information, more about Gilco Highway Patch is needed, you will have the option of searching as many as seven data files. These files contain such information and data as indicated by the titles of the seven data files described in paragraph 11.

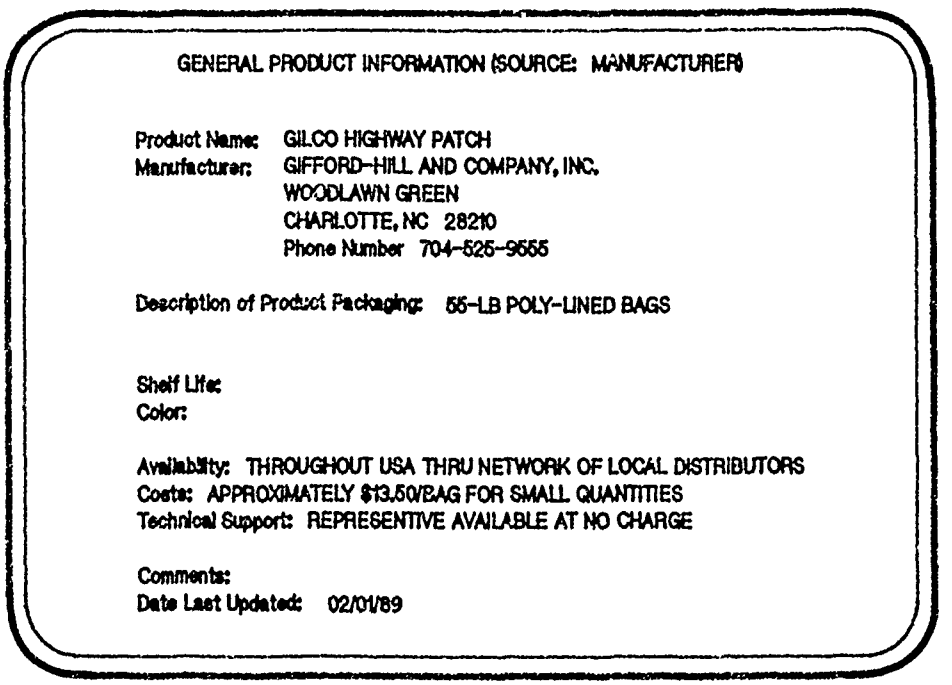
29. Press the <1> and <ENTER> keys for limited END-USE PRODUCT information:



30. Press the <2> and <ENTER> keys to access other data for this product. A RETRIEVAL OPTIONS menu will appear, indicating those data files that contain additional information and data on Gilco Highway Patch. For the Gilco Highway Patch, the data base contains only the manufacturer's information. If Corps or other agency information were available, technical information obtained from both the manufacturer and the Corps could be compared. Possibly such a comparison would aid you in a more informed selection of the repair material best suited to your particular needs.



31. Press the <5> and <ENTER> keys for GENERAL MANUFACTURER'S INFORMATION and the following screen will appear:*



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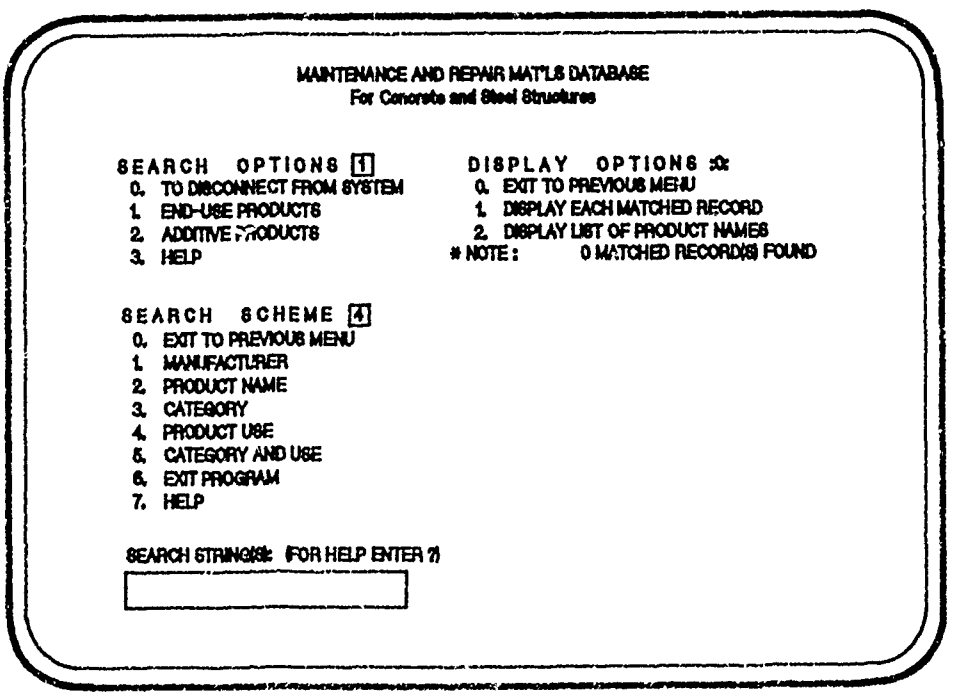
* A table of factors for converting non-SI units of measurement (55 lb shown in screen, paragraph 31) to SI (metric) units is presented on page 3.

32. The manufacturer's literature for this product contained about one-half of the information that could be accommodated in this data file. Press any key, and the RETRIEVAL OPTIONS menu will appear again. You now have the option to view other data files that contain information on the Gilco Highway Patch. Your other options with the RETRIEVAL OPTIONS menu are to exit to a previous menu or go to the next product found in the search.

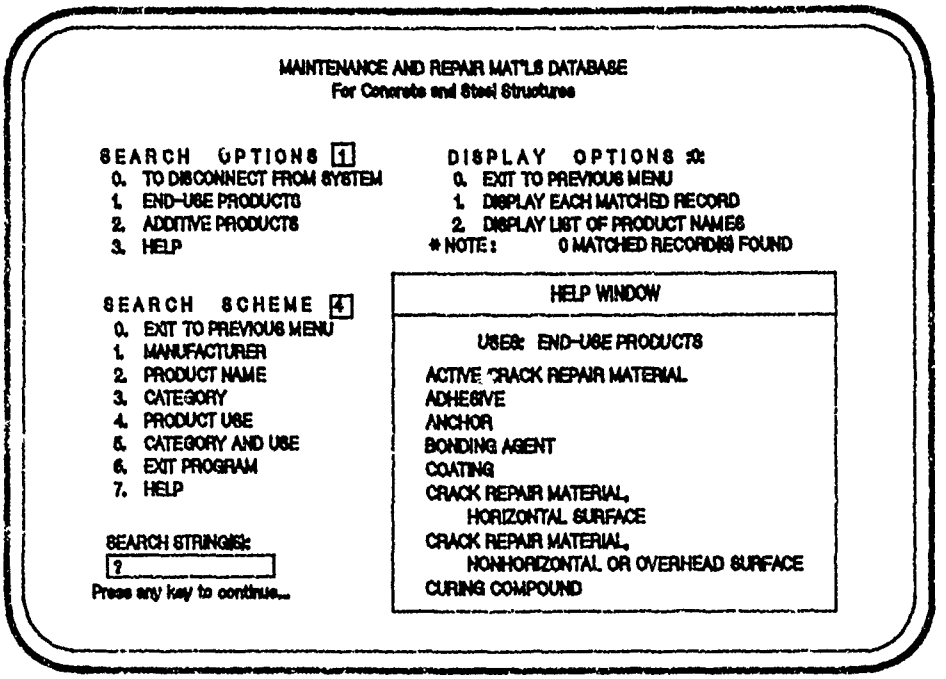
Search by Product Use

33. For this example, let us assume you want to repair a spall in a concrete pavement; you need a PATCHING MATERIAL,HORIZONTAL SURFACE. Before beginning the second search example, a short discussion of the definitions of PRODUCT USE for END-USE PRODUCTS appears in order.

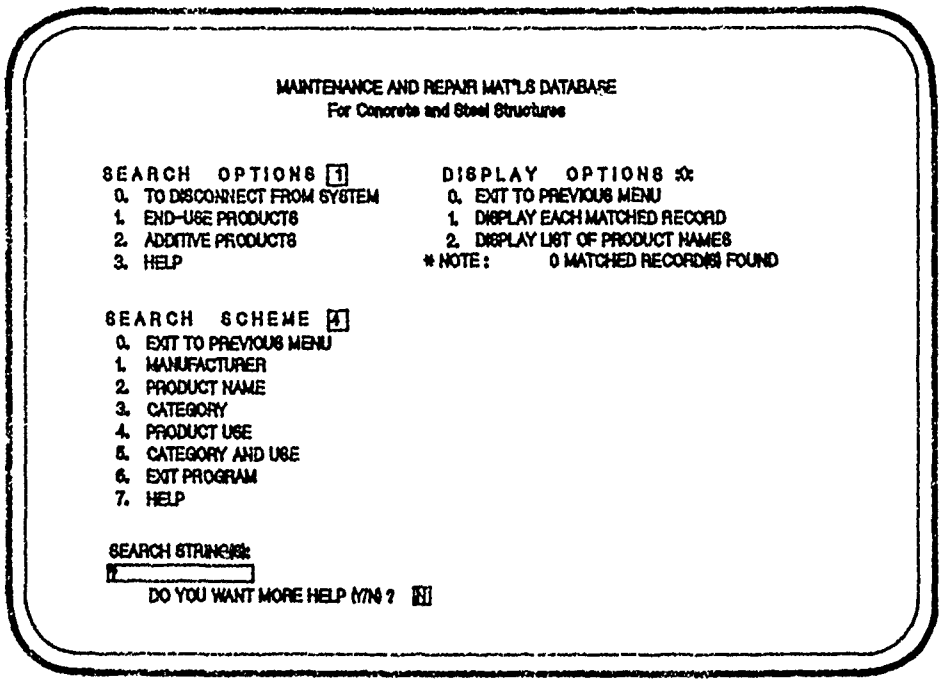
34. With the SEARCH SCHEME on the screen, press the <4> and <ENTER> keys for PRODUCT USE, and the entry block for SEARCH STRING will be highlighted.



35. Press the <?> and <ENTER> keys for a listing of the 26 uses of END-USE PRODUCTS as defined in the data base. The first screen of search words will appear in the HELP WINDOW.

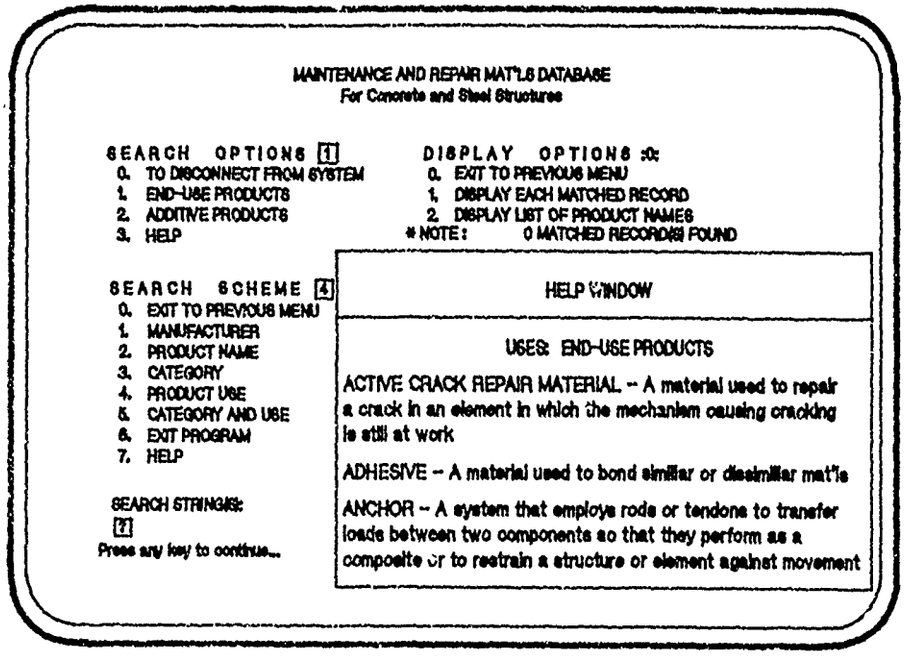


36. Press any key to continue to next help screen. When all search screens have been displayed, press any key and the entry block for MORE HELP will be highlighted.



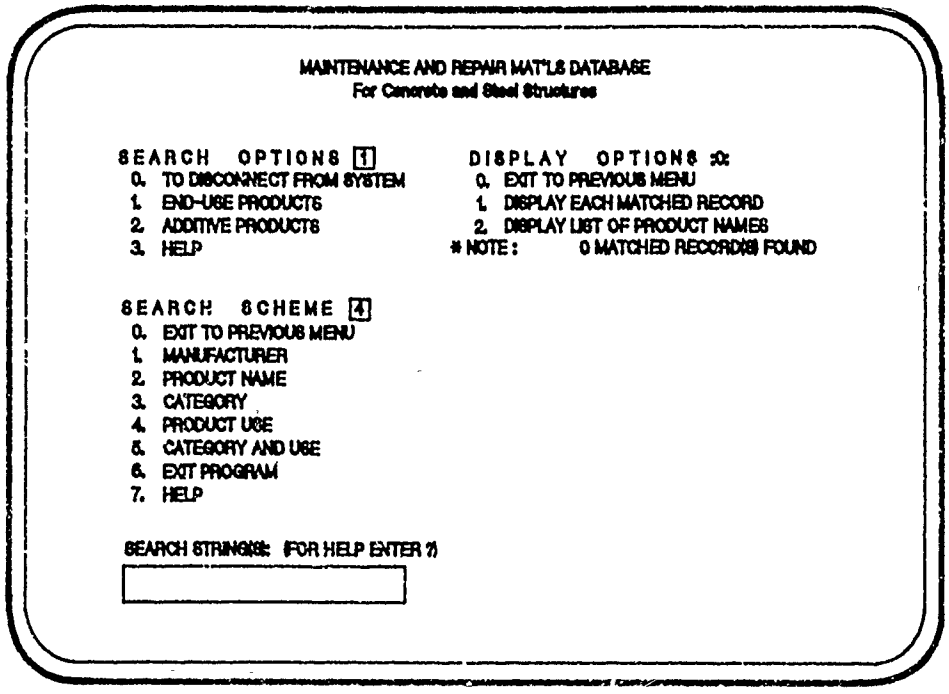
37. If no more help is needed, press the <ENTER> key, since N is the default selection, and the query "ENTER PRODUCT USE (ENTER ? FOR HELP):" will

appear. At this point, you would enter the actual PRODUCT USE. However, if more help is needed press the <Y> and <ENTER> keys, and the first screen of definitions will appear in the HELP WINDOW.

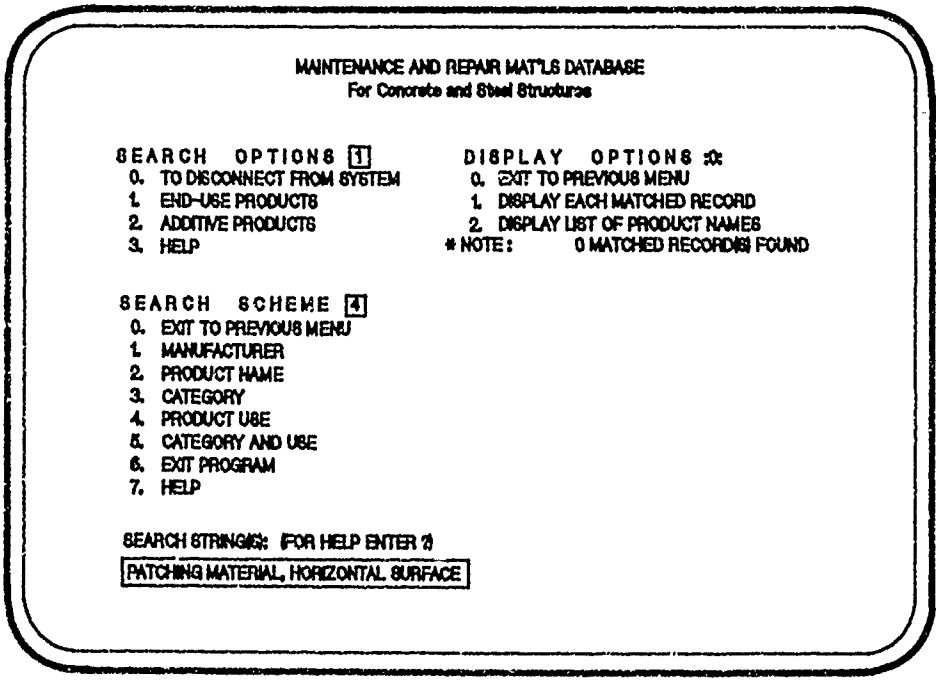


38. The help statement will not continue for the sake of brevity; there are four additional screens with the definitions. To view the remaining definitions, press any key to continue. Appendix A contains the help screens for CATEGORY and PRODUCT USES for both END-USE and ADDITIVE PRODUCTS.

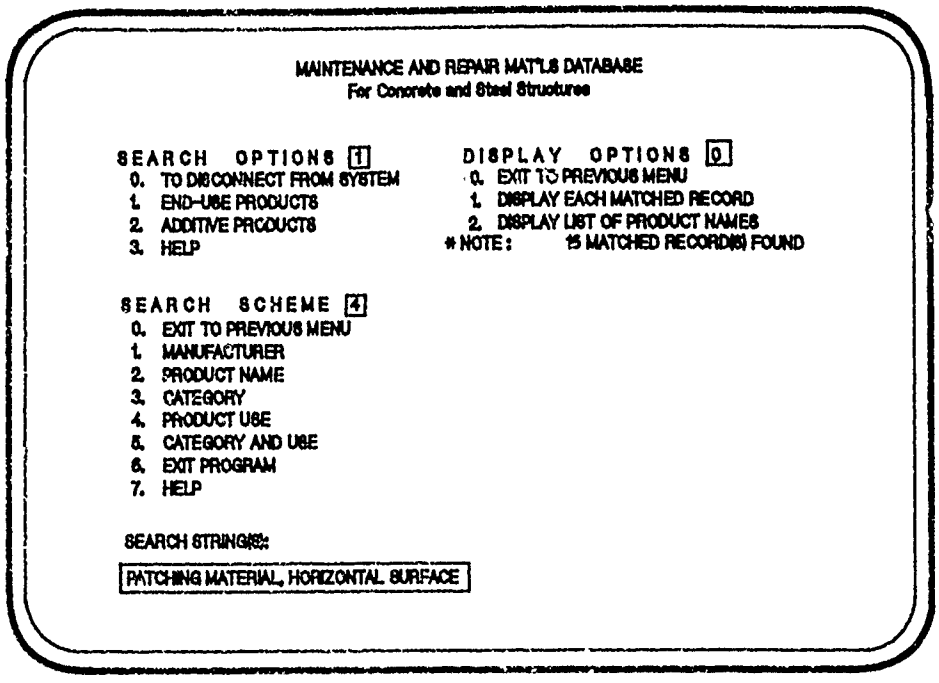
39. When the last screen with definitions is viewed and any key is pressed to continue, the entry block for SEARCH STRING will be highlighted.



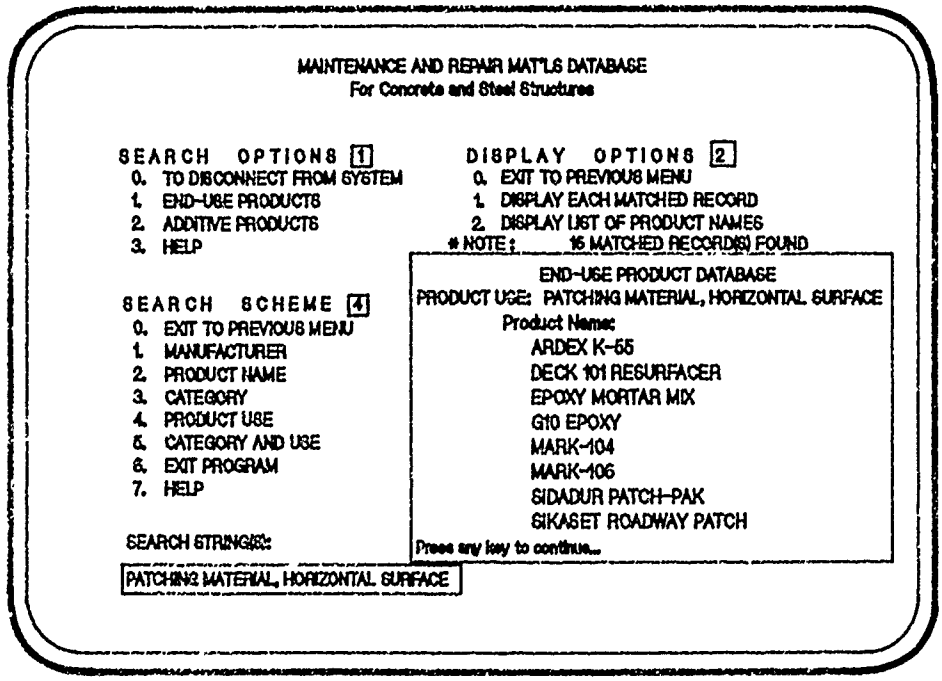
You can now type the PRODUCT USE search string, "PATCHING MATERIAL,HORIZONTAL SURFACE". The screen will show:



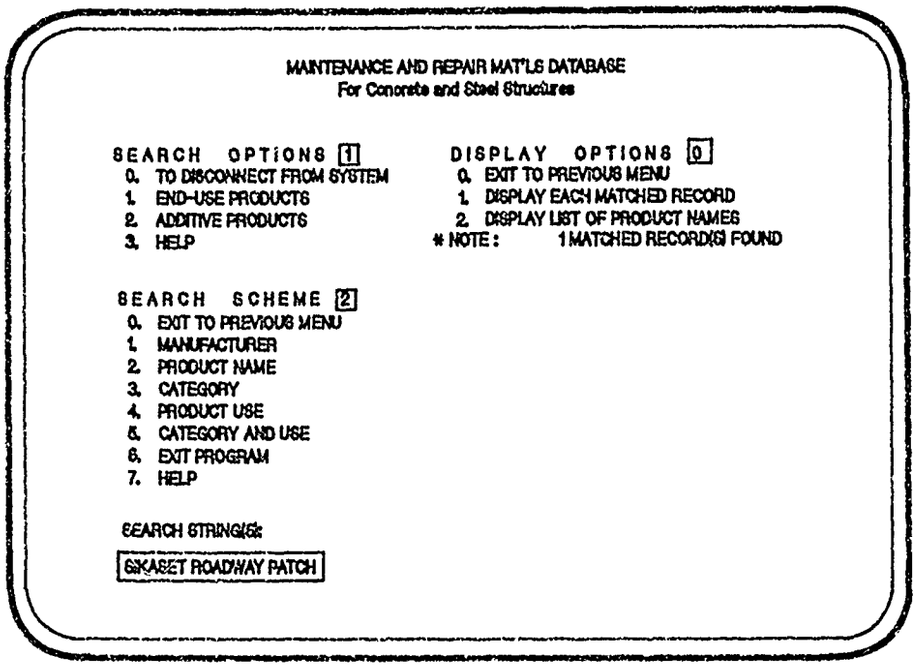
Press <ENTER> key and wait for the search to be completed. The entry block for the DISPLAY OPTIONS menu will be highlighted if matched records are found; as shown in the following illustration, 16 were found.



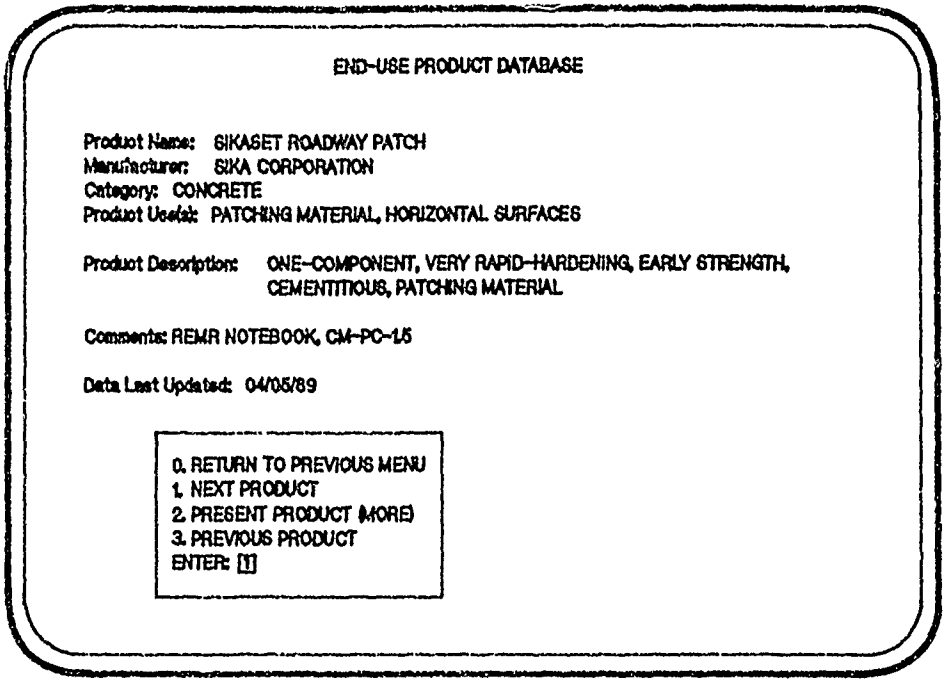
40. Press the <2> and <ENTER> keys to view the first screen of product names in the HELP WINDOW.



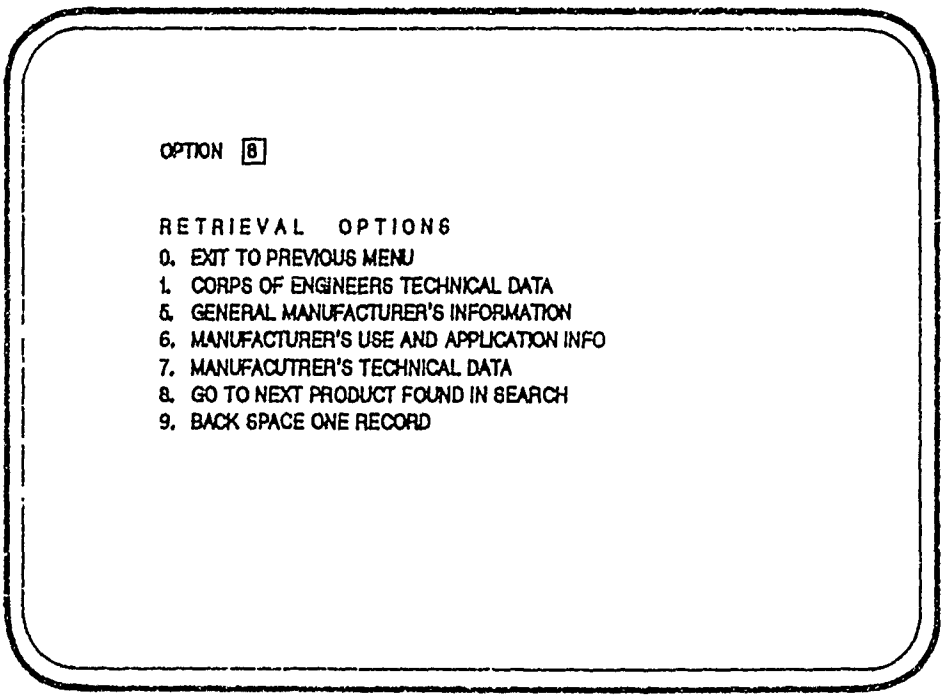
41. For more information on a particular product, press any key to continue. The entry block for the DISPLAY OPTIONS menu will be highlighted. Press the <0> and <ENTER> keys to return to the SEARCH SCHEME menu. Press the <2> and <ENTER> keys to search by a particular PRODUCT NAME, such as SIKASET ROADWAY PATCH from the illustration in paragraph 40. To take a quick look to check the uses of this repair material, type in "SIKASET ROADWAY PATCH" and press <ENTER>; a search is made and the entry block for the DISPLAY OPTIONS menu is highlighted and the number of match records is displayed.



42. Press the <1> and <ENTER> keys for limited END-USE PRODUCT information.



By pressing the <2> and <ENTER> keys, additional information about SIKASET ROADWAY PATCH can be viewed as revealed in the RETRIEVAL OPTIONS menu.

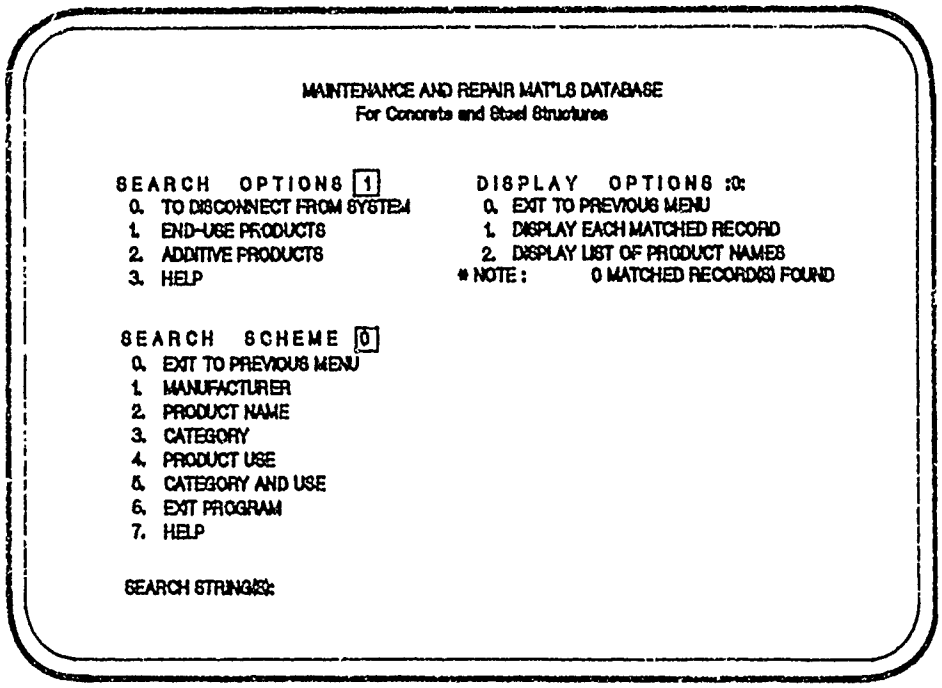


You may wish to view Options 5, 6, and 7 or press 0 to return to previous menu.

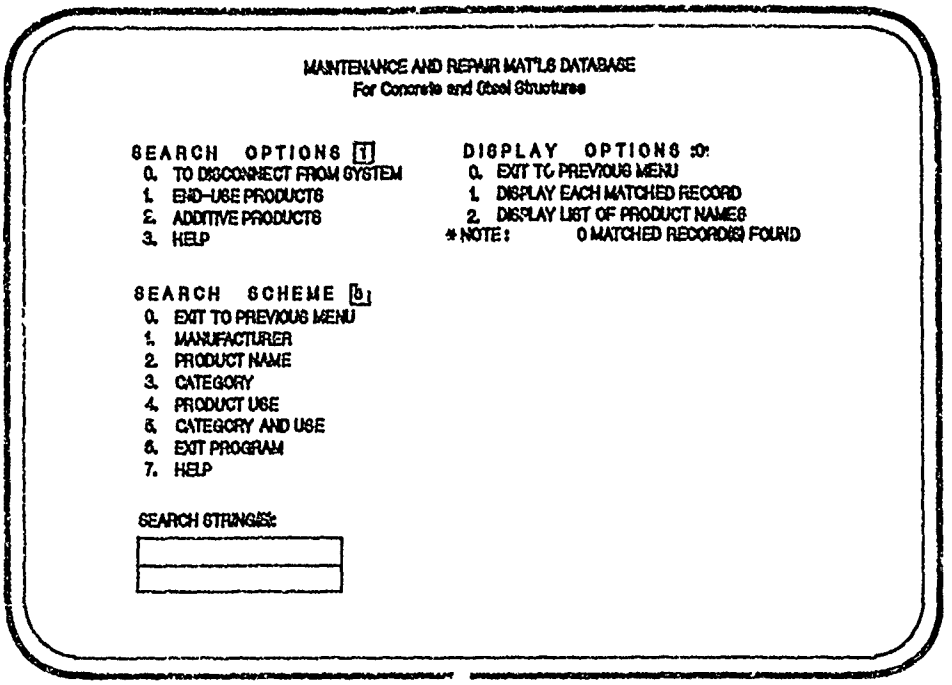
Search by Product Category and Use

43. Searching for a repair material by the SEARCH SCHEME option, CATEGORY and PRODUCT USE, is quite simple.

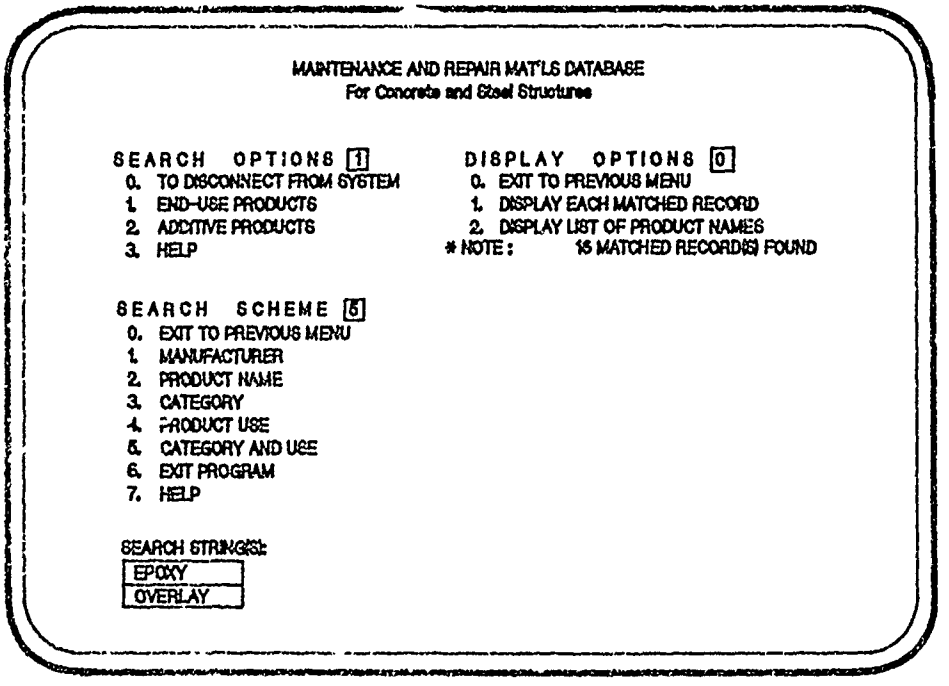
44. This scheme is useful when the basic material type (CATEGORY) needed for the repair problem is known. Your search time in the data base is shortened using this scheme, because it narrows the number of possible repair materials for a specific repair problem (PRODUCT USE). For example, go to the SEARCH SCHEME menu.



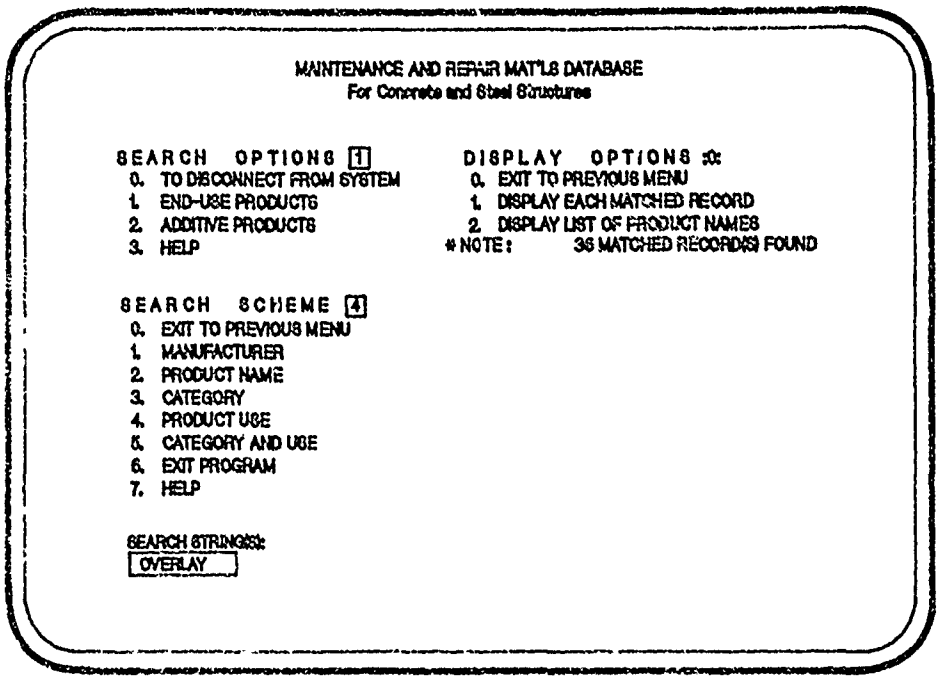
Press the <5> and <ENTER> keys and the entry block for the SEARCH STRING will be highlighted.



Type in "Epoxy" for CATEGORY and "Overlay" for PRODUCT USE; wait for the search to be completed and the number of matches will be displayed.



Sixteen matched records were found. If you did not know to use an epoxy for an overlay job and you searched the data base using the PRODUCT USE term "Overlay", the results would be displayed in the following screen.



45. Thirty-six matched records were found that include the following CATEGORIES: Epoxy, Grout, Grout (Portland-Cement Mortar), Polymer, Polymer Mortar, Polymer Modified Concrete, Polymer Concrete, Polymer Modified Grout, and Acrylic. More products are displayed from a search by PRODUCT USE as opposed to a search by CATEGORY and PRODUCT USE.

APPENDIX A

KEYWORDS AND DEFINITIONS FOR PRODUCT CATEGORIES AND USE FIELDS

CATEGORIES: END-USE PRODUCTS (Basic Material Types)

ACRYLIC
ASPHALT
CERAMIC
CONCRETE
ELASTOMER
EPOXY
GROUT
MASONRY
MINERAL
MORTAR
NONFERROUS METAL
NON-PORTLAND CEMENT
NON-PORTLAND CEMENT CONCRETE
NON-PORTLAND CEMENT GROUT
NON-PORTLAND CEMENT MORTAR
NON-PORTLAND CEMENT SHOTCRETE
OIL
POLYMER
POLYMER CONCRETE
POLYMER GROUT
POLYMER MODIFIED CONCRETE
POLYMER MODIFIED GROUT
POLYMER MODIFIED MORTAR
POLYMER MODIFIED SHOTCRETE
POLYMER MORTAR
POLYMER SHOTCRETE
PORTLAND CEMENT
PORTLAND CEMENT CONCRETE
PORTLAND CEMENT GROUT
PORTLAND CEMENT MORTAR
PORTLAND CEMENT SHOTCRETE
RESIN
RUBBER
SHOTCRETE
SILANE
SILICATE
SILICONE
SILOXANE
STEEL
TAR
WAX
WOOD

USES: END-USE PRODUCTS

ACTIVE CRACK REPAIR MATERIAL
ADHESIVE
ANCHOR
BEARING PAD MATERIAL
BONDING AGENT
COATING(CONCRETE,STEEL,
    CONCRETE/STEEL)
CRACK INJECTION REPAIR MAT'L
CRACK REPAIR MATERIAL,
    HORIZONTAL SURFACE
    NONHORIZONTAL SURFACE
    OVERHEAD SURFACE
CURING COMPOUND
DAMPPROOFING
FASTENER
IMPREGNATION
JOINT REPAIR MATERIAL,
    HORIZONTAL SURFACE
    NONHORIZONTAL SURFACE
    OVERHEAD SURFACE
MEMBRANE
OVERLAY
PAINT(CONCRETE,STEEL,
    CONCRETE/STEEL)
PATCHING MATERIAL,
    HORIZONTAL SURFACE
    NONHORIZONTAL SURFACE
    OVERHEAD SURFACE
PRESSURE GROUTING
SEALER
SEEPAGE REPAIR MATERIAL
SKID RESISTANT COATING
STEEL REBUILDING MATERIAL
STRUCTURAL REPAIR MATERIAL
SURFACE HARDENER
SURFACE RETARDER
TOPING
UNDERWATER REPAIR MATERIAL
WATERPROOFING
WATERSTOP REPAIR MATERIAL

CATEGORIES: END-USE PRODUCTS
(Basic Material Types)

ACRYLIC - One of a group of thermoplastic resins formed by polymerizing the esters or amides of acrylic acid

ASPHALT - A semisolid mixture of bitumens obtained from native deposits of petroleum

CERAMIC - A material made by firing inorganic nonmetallic raw materials

CONCRETE - A composite material which consists essentially of a binding medium within which are embedded particles or fragments of aggregate; usually a combination of fine aggregate and coarse aggregate

ELASTOMER - A macromolecular material that returns rapidly to approximately the initial dimensions and shape after substantial deformation by a weak stress and release of the stress

EPOXY - A resin containing epoxide groups

GROUT - A mixture containing a binding medium, with or without aggregate, proportioned to produce a pourable consistency

MASONRY - Construction composed of shaped or molded units, usually small enough to be handled by one person and composed of stone, ceramic brick or tile, concrete, glass, adobe, or the like

MINERAL - A naturally occurring inorganic substance having a definite chemical composition and usually, a characteristic crystalline structure, color, and hardness

MORTAR - A material containing a binding medium within which are embedded particles of fine aggregate

NONFERROUS METAL - A metal other than iron

NON-PORTLAND CEMENT - A hydraulic cement other than portland

NON-PORTLAND CEMENT CONCRETE - A concrete in which the binder is a hydraulic cement paste other than portland

NON-PORTLAND CEMENT GROUT - A grout in which the binder is a hydraulic cement paste other than portland

NON-PORTLAND CEMENT MORTAR - A mortar in which the binder is a hydraulic cement paste other than portland

NON-PORTLAND CEMENT SHOTCRETE - A shotcrete in which the binder is a hydraulic cement paste other than portland

OIL - Organic combustible liquid soluble in organic solvents but not water

POLYMER - The product of polymerization in which repeating units derived from monomers are linked together in a chain-like structure

POLYMER CONCRETE - A concrete in which the binder is an organic polymer

POLYMER GROUT - A grout in which the binder is an organic polymer

POLYMER MODIFIED CONCRETE -A concrete in which the binder includes portland cement paste and an organic polymer

POLYMER MODIFIED GROUT - A grout in which the binder includes portland cement paste and an organic polymer

POLYMER MODIFIED MORTAR - A mortar in which the binder includes portland cement paste and an organic polymer

POLYMER MODIFIED SHOTCRETE - A shotcrete in which the binder includes portland cement paste and an organic polymer

POLYMER MORTAR - A mortar in which the binder is an organic polymer

POLYMER SHOTCRETE - A shotcrete in which the binder is an organic polymer

PORTLAND CEMENT - A hydraulic cement produced by pulverizing clinker consisting essentially of hydraulic calcium silicates and usually containing one or more of the forms of calcium sulfate as an interground addition.

PORTLAND CEMENT CONCRETE - A concrete in which the binder is portland cement paste

PORTLAND CEMENT GROUT - A grout in which the binder is portland cement paste

PORTLAND CEMENT MORTAR - A mortar in which the binder is portland cement paste

PORTLAND CEMENT SHOTCRETE - A shotcrete in which the binder is portland cement paste

RESIN - A solid or semisolid organic material often of high molecular weight, which exhibits a tendency to flow when subjected to stress

RUBBER - A natural or synthetic polymer highly elastic material; elastomer compound

SHOTCRETE - Concrete or mortar pneumatically projected at high velocity on to a surface

SILANE - A compound of silicon and hydrogen of the formula $Si_nH_{(2n+2)}$ analogous to the alkanes or saturated hydrocarbons.

SILICATE - A salt of silicic acid

SILICONE - A resin characterized by water-repellant properties, in which the main polymer chain consists of alternating silicon and oxygen atoms with carbon-containing side groups

SILOXANE - A compound of silicon and oxygen, containing structural units of hydrogen and carbon in the form of CH_3 (or may also be units of H, C_2H_5, or more complex substituents.

STEEL - An alloy of iron and carbon

TAR - Brown or black bituminous material, liquid or semisolid in consistency, in which the predominating constituents are bitumens obtained as condensates in the destructive distillation of coal, petroleum, oil-shale, wood, or other organic materials

WAX - A substance pliable or liquid that is a complex mixture of hydrocarbons obtained from distillates of wood, coal, petroleum, or shale oil; a substance resembling beeswax

WOOD - A fibrous cellular substance consisting largely of cellulose and lignin, the xylem of trees and shrubs

USES: END-USE PRODUCTS

ACTIVE CRACK REPAIR MATERIAL - A material used to repair a crack in a element in which the mechanism causing cracking is still at work

ADHESIVE - A material used to bond similar or dissimilar materials

ANCHOR - A system that employs rods or tendons to transfer loads between two components so that they perform as a composite or to restrain an element against movement

BEARING PAD MATERIAL - A material used in bearing elements to distribute concentrated loads over a wider area.

BONDING AGENT - An agent applied to a suitable substrate to create a bond between it and something else

COATING - A material applied to a surface by brushing, dipping, mopping spraying, trowelling, etc. to preserve, protect, decorate, seal, or smooth the surface

CRACK INJECTION REPAIR MATERIAL - A material that is injected into concrete voids and cracks for the purpose of improving mechanical properties, sealing against water leakage, or both

CRACK REPAIR MATERIAL, HORIZONTAL SURFACE - A material used to repair cracks appearing in horizontal top surfaces of floors, slabs, decks, etc.

CRACK REPAIR MATERIAL, NONHORIZONTAL SURFACE - A material designed to repair cracks appearing in sloped or vertical wall faces

CRACK REPAIR MATERIAL, OVERHEAD SURFACE - A material designed to repair cracks appearing in ceilings

CURING COMPOUND - A liquid applied to the surface of newly placed concrete to retard the loss of water during the early hardening period

DAMPPROOFING - A surface treatment or coating to retard the passage of water in the absence of hydrostatic pressure

FASTENER - A connection use to join

IMPREGNATION - A process in which a low viscosity material is used to penetrate into the pores of the concrete

JOINT REPAIR MATERIAL, HORIZONTAL SURFACE - A material used to repair joints appearing in horizontal top surfaces of floors, slabs, decks, etc.

JOINT REPAIR MATERIAL, NONHORIZONTAL SURFACE - A material designed to repair joints appearing in sloped or vertical wall faces

JOINT REPAIR MATERIAL, OVERHEAD SURFACE - A material designed to repair joints appearing in ceilings

MEMBRANE - A film applied to a surface to a surface to restrict moisture movement and evaporation

OVERLAY - A layer of material, seldom thinner than 1 in., placed on and usually bonded to the worn or cracked surface of a concrete slab to restore or improve the function of the slab

PAINT - A pigmented coating applied as a thin layer to a substrate by brush, spray, roller, immersion, or any other suitable means for protection

PATCHING MATERIAL, HORIZONTAL SURFACE - A material used to repair voids, appearing in horizontal top surfaces of floors, slabs, decks, etc.

PATCHING MATERIAL, NONHORIZONTAL SURFACE - A material designed to repair voids appearing in a sloped or vertical wall faces

PATCHING MATERIAL, OVERHEAD SURFACE - A material designed to repair voids appearing in ceilings

PRESSURE GROUTING - The process of filling voids within a structure or foundation with a grout under pressure.

SEALER - A liquid of low viscosity applied as a coating to the surface of hardened concrete to prevent or decrease the penetration of liquid and, for some products, gaseous media during service; to prevent moisture migration or seepage out of the concrete

SEEPAGE REPAIR MATERIAL - A material used to stop or reduce seepage through cracks, joints, or areas of porous and cracked concrete

SKID RESISTANT COATING - A coating applied to a surface to increase its resistance to skidding

STEEL REBUILDING MATERIAL - A material used to build back scoured and pitted surfaces or rebuild steel components

STRUCTURAL REPAIR MATERIAL - A material used to restore or improve the load capacity of a structure or element

SURFACE HARDENER - A material used by application to a surface of concrete to improve wear resistance and reduce dusting

SURFACE RETARDER - A material used by application to a form or to a surface of freshly placed concrete to delay setting of the cement to facilitate construction joint cleanup or production of exposed aggregate finish

TOPPING - A layer of concrete, grout, or mortar placed to form a floor surface on a concrete base

UNDERWATER REPAIR MATERIAL - A material used for underwater repair of concrete

WATERPROOFING - A surface treatment or coating used to retard the passage of water under hydrostatic pressure.

WATERSTOP REPAIR MATERIAL - A material used to stop seepage at a joint in which the waterstop has failed

CATEGORIES: ADDITIVE PRODUCTS
(Basic Type of End-Use Material for which Product is an Additive)

NON-PORTLAND CEMENT CONCRETE
NON-PORTLAND CEMENT GROUT
NON-PORTLAND CEMENT MORTAR
NON-PORTLAND CEMENT SHOTCRETE
POLYMER CONCRETE
POLYMER GROUT
POLYMER MODIFIED CONCRETE
POLYMER MODIFIED GROUT
POLYMER MODIFIED MORTAR
POLYMER MODIFIED SHOTCRETE
POLYMER MORTAR
POLYMER SHOTCRETE
PORTLAND CEMENT CONCRETE
PORTLAND CEMENT GROUT
PORTLAND CEMENT MORTAR
PORTLAND CEMENT SHOTCRETE

USES: ADDITIVE PRODUCTS

ACCELERATOR
ACRYLIC ADMIXTURE
ACRYLIC CEMENT
AIR-ENTRAINING AGENT
ALKALI-AGGREGATE EXPANSION RETARDING ADMIXTURE
BONDING ADMIXTURE
COLORING ADMIXTURE
CORROSION INHIBITOR
DAMPPROOFING ADMIXTURE
EPOXY ADMIXTURE
EPOXY CEMENT
EXPANSION-PRODUCING ADMIXTURE
FIBER REINFORCEMENT
FLOCCULATING ADMIXTURE
FLY ASH
FUNGICIDAL, GERMICIDAL, OR INSECTICIDAL ADMIXTURE
GAS-FORMING ADMIXTURE
HIGH RANGE WATER REDUCER
HYDRAULIC-CEMENT ADMIXTURE
LATEX ADMIXTURE
NON-PORTLAND CEMENT
PERMEABILITY-REDUCING ADMIX
POLYMER ADMIXTURE
POLYMER CEMENT
PORTLAND CEMENT
PUMPING AID
RETARDER
SILICA FUME
SKID RESISTANT MATERIAL
UNDERWATER ADMIXTURE
WATER REDUCER

CATEGORIES: ADDITIVE PRODUCTS
(Basic Type of End-Use Material
for which Product is an Additive)

NON-PORTLAND CEMENT CONCRETE - A concrete in which the binder is a hydraulic cement paste other than portland

NON-PORTLAND CEMENT GROUT - A grout in which the binder is a hydraulic cement paste other than portland

NON-PORTLAND CEMENT MORTAR - A mortar in which the binder is a hydraulic cement paste other than portland

NON-PORTLAND CEMENT SHOTCRETE - A shotcrete in which the binder is a hydraulic cement paste other than portland

POLYMER CONCRETE - A concrete in which the binder is an organic polymer

POLYMER GROUT - A grout in which the binder is an organic polymer

POLYMER MODIFIED CONCRETE -A concrete in which the binder includes portland cement paste and an organic polymer

POLYMER MODIFIED GROUT - A grout in which the binder includes portland cement paste and an organic polymer

POLYMER MODIFIED MORTAR - A mortar in which the binder includes portland cement paste and an organic polymer

POLYMER MODIFIED SHOTCRETE - A shotcrete in which the binder includes portland cement paste and an organic polymer

POLYMER MORTAR - A mortar in which the binder is an organic polymer

POLYMER SHOTCRETE - A shotcrete in which the binder is an organic polymer

PORTLAND CEMENT CONCRETE - A concrete in which the binder is portland cement paste

PORTLAND CEMENT GROUT - A grout in which the binder is portland cement paste

PORTLAND CEMENT MORTAR - A mortar in which the binder is portland cement paste

PORTLAND CEMENT SHOTCRETE - A shotcrete in which the binder is portland cement paste

USES: ADDITIVE PRODUCTS

ACCELERATOR - An admixture used in portland cement mixtures to shorten the time of setting or increase the rate of strength development

ACRYLIC ADMIXTURE - An acrylic admixture used in portland cement mixtures to improve mechanical properties

ACRYLIC CEMENT - An acrylic monomer used in polymerized form as the binder in acrylic based polymer concrete, grout, mortar, and shotcrete

AIR-ENTRAINING AGENT - An admixture used to entrain a system of minute (generally smaller than 1 mm) bubbles of air in portland cement paste

ALKALI-AGGREGATE EXPANSION RETARDING ADMIXTURE - An admixture used in portland cement mixtures to reduce expansion caused by alkali-aggregate reaction

BONDING ADMIXTURE - An admixture used in portland cement mixtures to enhance bonding properties.

COLORING ADMIXTURE - An admixture, usually in the form of an insoluble fine powder, used in portland cement mixtures to add color.

CORROSION INHIBITOR - An admixture used in portland cement mixtures to reduce rate of corrosion of embedded steel

DAMPPROOFING ADMIXTURE - An admixture used in portland cement mixtures to retard the passage or absorption of water

EPOXY ADMIXTURE - An epoxy admixture used in portland cement mixtures to improve mechanical properties

EPOXY CEMENT - An epoxy resin used in polymerized form as the binder in epoxy based polymer concrete, grout, mortar, and shotcrete

EXPANSION-PRODUCING ADMIXTURE - An admixture used in portland cement mixtures to cause expansion and, thereby, minimize the effects of drying shrinkage

FIBER REINFORCEMENT - Fibers of steel, plastic, or other material used in making fiber concrete, grout, mortar, shotcrete

FLOCCULATING ADMIXTURE - An admixture used in portland cement mixtures to increase the tendency of paste to behave as one large floc

FLY ASH - A pozzolanic admixture used in portland cement mixtures that is the incombustible residue of the burning of powdered coal transported from the firebox through the boiler by flue gases

FUNGICIDAL, GERMICIDAL, OR INSECTICIDAL ADMIXTURE- An admixture used in portland cement mixtures to inhibit and control the growth or bacteria and fungus on concrete

GAS-FORMING ADMIXTURE - An admixture used in portland cement mixtures to counteract settlement and bleeding

HIGH RANGE WATER REDUCER - An admixture used in portland cement mixtures that is capable of producing large water reduction or great flowability without causing undue set, retardation, or entrainment of air

HYDRAULIC-CEMENT ADMIXTURE - An hydraulic cement used as an admixture in portland cement mixtures

LATEX ADMIXTURE - An admixture that is an emulsifiable polymer used in polymerized form as a cobinder in polymer modified concrete, grout, mortar, or shotcrete

NON-PORTLAND CEMENT - A hydraulic cement, other than portland, used as the binder in non-portland cement concrete, grout, mortar, or shotcrete

PERMEABILITY-REDUCING ADMIXTURE - An admixture used in portland cement mixtures to retard the passage of water under hydrostatic pressure

POLYMER ADMIXTURE - An polymer admixture used in portland cement mixtures to improve mechanical properties

POLYMER CEMENT - A polymer or copolymer used in polymerized form as the binder in polymer concrete, grout, mortar, and shotcrete

PORTLAND CEMENT - A hydraulic cement produced by pulverizing clinker consisting essentially of hydraulic calcium silicates, and usually containing one or more of the forms of calcium sulfate as an interground addition

PUMPING AID - An admixture used in portland cement mixtures to improve pumpability

RETARDER - An admixture used in portland cement mixtures to delay time of setting

SILICA FUME - An admixture used in portland cement mixtures that is a very fine noncrystalline silica produced by electric furnace in production of silicon or ferrousilicon

SKID RESISTANT MATERIAL - An admixture used to improve the frictional characteristics of portland cement surfaces

UNDERWATER ADMIXTURE - An admixture used in portland cement mixtures to improve underwater placement

WATER REDUCER - An admixture used in portland cement mixtures that either increases slump of a freshly mixed batch without increasing water content or maintains slump with a reduced amount of water, due to factors other than air entrainment