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THE PLASTEC INDEXING SYSTEM: A CONSIDERATION OF
POSSIBLE ADJUSTMENTS REQUIRED BY THE DDC PROGRAM FOR
SERVICE SUPPORT TO PLASTEC

R. Stephen Tompkins

Tracor Jitco, Incorporated

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15 December 1975

Plastics Technical Evaluation Center
Picatinny Arsenal
Dover, New Jersey

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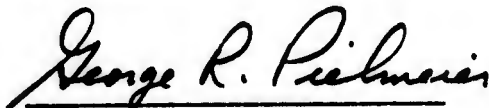
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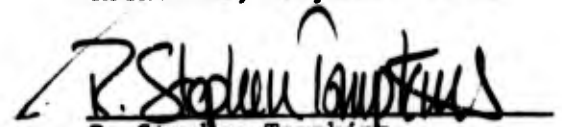
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This report examines the precoordinated system of indexing used by the Plastics Technical Evaluation Center (PLASTECH) to determine present problems with the system as well as new requirements that would be forced onto the system as a result of the conversion to computerized service and support by the Defense Documentation Center (DDC). Recommendations made for the improvement of PLASTECH indexing are: (1) improved management of indexing operations, (2) the production of an interim controlled vocabulary list, and (3) the creation of a microthesaurus of plastics terms.

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1. Introduction

1.1 Objectives

This report examines the indexing used by PLASTECH (Plastics Technical Evaluation Center) to determine the problems that exist in the present system and examines the changes that would be forced onto the system by the DDC (Defense Documentation Center) service support to PLASTECH, and recommends changes that would satisfy these requirements.

1.2 Circumstances

The original supposition was that DDC system constraints would force PLASTECH to abandon its present paired-term indexing in favor of a unit term system. It was felt further that the logical outgrowth of this change would be a microthesaurus of plastics terms to be used in the new indexing system.

At a later point in the investigation, DDC informed PLASTECH that the paired term system could be fully utilized for inputting index terms and for printed output. However, the search options would remain the same for both systems. Input consisting of paired terms would be broken down to unit concepts (posting terms) for computer storage purposes and thus would be searched by machine in the same way as DDC's index terms.

1.3 Report Outcome

The report, however, carries through with much of its original intention except that the outcome was not anticipated. A short historical review of the PLASTECH index is given. All aspects of indexing with respect to the merger are examined. PLASTECH indexing is compared with DDC's and advantages as well as problems are discussed. Recommendations are made for improving the present system and the report concludes with the suggestion that a controlled vocabulary list be created for PLASTECH as an interim aid until such time as a microthesaurus of plastics terms can be prepared.

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2. Review of Indexing Approaches

2.1 PLASTECH - Introduction

The Plastics Technical Evaluation Center (PLASTECH) is one of over 22 technical information analysis centers sponsored by the Department of Defense (DOD) to keep its technical personnel fully informed of current and significant technical information and data.

Established in 1960, the PLASTECH document collection includes more than 25,000 reports, conference proceedings and technical papers from government and private industry which have been collected, evaluated, indexed and abstracted.

To collect and maintain these documents, PLASTECH employs both in-house and contractor information and subject specialists.

In addition to these efforts, PLASTECH's specialists are involved in the production of state-of-the-art reports, handbooks, newsletters, current awareness studies, engineering consultations, bibliographies, literature searches, technical inquiries and special investigations on plastics, composites and adhesives.

2.2 Evolution of PLASTECH Index

2.2.1 Early Development

Very early in the history of PLASTECH an index to its holdings became necessary. The development of its format can be traced to the compilation of an index to ordnance data at Picatinny Arsenal in which the subject and uniterm approaches were discarded in favor of a precoordinated system of indexing [1,2]. The intent of this approach was to bind single terms together for greater specificity. Compounds could be linked with particular properties, applications, etc., and the number of postings per term could be reduced.

The most important objectives for the new index were that it be expandable and that the number of postings per term be held to less than ten. Another influencing factor was that this system was designed for manual use by subject specialists. Without the aid of computers to perform the post-coordination of uniterms and the scanning of document postings for "hits" timely responses to information requests would have been difficult. The difficulty in searching for "hits" manually is illustrated in Figure 1.

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PROPERTIES									
200	11	182	373	24	5	206	217	93	19
410	221	572	543	31	245	326	337	838	919
480	301	632	973	101	255	336	387	978	1379
510	731	952	1293	744	315	306	447	1038	1359
530	861	1192	1313	914	385	416	517	1203	1469
630	1441	1202	1433	981	465	636	1057	1299	1669
690	1651	1302	1623	1174	525	926	1037	1448	1729
700	1741	1352	1713	1364	755	936	1187	1453	1759
1360	1961	1372	1783	1414	1145	1016	1437	1503	1959
1510		1402	2023	1431	1175	1166	1517	1633	1979
1600		1442	2143	1524	1435	1416	1597	1893	
1740		1452	2193	1744	1445	1466	1617	2078	
1850		1542			1675	1476	2147		
1940		1562			1755	1496			
2060		1632			2005	1506			
		1732			2195	1656			
		1752			2205	1716			
		1802				1766			
		2022				1806			
						2136			
						2176			
						2196			
DETONATOR									
250	381	52	3	144	105	76	137	28	119
330	431	172	23	294	255	106	227	78	199
680	561	312	263	531	365	566	277	178	209
760	1381	832	393	624	415	856	297	328	229
920	1411	802	413	784	525	866	507	318	419
1000	1751	892	763	944	645	1246	657	353	599
1330		932	833	1314	735	1316	707	518	609
1450		1132	1083	1644	745	1516	807	628	629
1460		1422	1383	1831	955	1876	827	708	719
		1432	1513	2164	1145	1976	967	749	849
		1982	1733		1305		1387	788	999
		2032			1475		1617	1318	1539
					1515		1657	1528	1569
					1915		2227	1768	1599
					1965			2178	1879
								2198	1949

Figure 1. Uniterm Index to Picatinny Arsenal Technical Reports, No's 1-2236, December, 1955.

Detonator - Properties
 255 525 944 1145

Figure 2. Example of Precoordinated Indexing

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In the index sample the two terms have been assigned to over 100 documents each and yet a user of this index would find only four "hits" if seeking information on "the properties of detonators." If the four documents had been indexed by precoordinating the terms, the index entry would appear as in Figure 2.

The next step in developing the index made it even more suitable for manual use. The normal sort for an index is alphabetical. This had the effect of "hiding" the second section of the paired term. The solution was to invert or transpose the terms around the hyphen, create a second listing and then merge the two lists. This step doubled the number of index entries but greatly improved the ease of use.

2.2.2 Current Index Characteristics

Once the basic format had been selected, only minor changes marked the evolution to its present form. The early indexes were in a combined form listing in one file three classes of terms:

1. Precoordinated subject terms.
2. Individual authors and conference names.
3. Government project and contract numbers.

Within a short time this had become cumbersome and the index was divided into five classes. The next major change was the addition of a short one-sentence descriptive statement to the document accession number in the subject index as an aid to the user. Figures 3-6 illustrate the development of the index.

1. The Subject Index is a precoordinated subject term index. In the index, the subject term is followed by the PLASTECH document number and a brief descriptive phrase.
2. The Author Index lists all authors (secondary as well as primary) of the documents in alphabetic order followed by the applicable document numbers.
3. The Source Index lists the corporate source for reports in alphabetic order followed by the applicable document numbers.
4. The Contract Number Index lists government contracts alphabetically by issuing agency and in numerical order within each agency listing, then the contractor followed by the applicable document numbers.

ARMY-PROJECT DA-3,99,15,105
2310

ARMY-TASK DA3A99-15-001-01
2335

ARMY/NAVY TEST EQUIPMENT INDEX
2470

AROMATIC FORMALDEHYDE RESIN-STUDY
3712-19

ARRIOLA, E.
1420 1427

ARROW HONEYCOMB-DEFINITION
1414

ASBESTOS/SILICONE
2149

ASD SYMPOSIUM-1961, SEPTEMBER
2315

ASSAULT BOAT-REPAIR KIT
2630 2070

Figure 3. PLASTECH Document Index, Vol. 1, No. 1, August 1962.

ADER, G. 1421	CORROSION BARRIER-EPOXY COATING 2366 2883-2 3345 3467 4297 4280 4684-1 4684-2 5304
ADICOFF, A. 3035	CORROSION BARRIER-EPOXY/PHENOLIC COATING 2883-2
AULER, R.S. 7876	CORROSION BARRIER-FINISH 4280
AEC SYMP RADIATION-GRAFT POLYMERIZATION-1962, NOV 5417	CORROSION BARRIER-FRP PIPE 3717-2
AELION, H. 3712-10	CORROSION BARRIER-FUEL TANK COATING 3050 5311 5583 5638 P 3322 P 3325
AEROJET GENERAL-MATERIALS RESEARCH REPORTS 5475	CORROSION BARRIER-KRAFT 2359
AEROSPACE EXPANDABLE STRUCTURE CONFERENCE-196 6444	

A. Individual authors and conference names. B. Precoordinated subject terms.

Figure 4. PLASTECH Document Index, Vol. 1, No. 3, August 1966.

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Meteoroid Effect-Space Vehicle
11164 Penetration of porous urethane
projectiles in aluminum and polycarbonate
targets for investigation of meteoroid
hazards.

Meteorological Rocket-Consumable
R11677 Optimization of material
composites for consumable meteorological
rocket motor cases, volume 1.

Microbial Degradation-Plastic
11461 Biological fouling of transparent
plastics

Gast, L.E.
11446-22

Gatti, A.
11375

Getza, P.E.
11210

Gaylord, N.G.
11420-05 11361-17

Gebhardt, J.J.
10927

Gehl, J.H.
11265

A. Precoordinated subject terms.

B. Individual authors

Society Of Plastics Engrs., Inc., Conference
11420

Society Of The Plastics Industry, Inc.
11237 11354 11354-15

Solar, NJ0019-67-C-0409
11579

Southern Regional Research Lab., Paper
11445-11

Southern Research Inst., Paper
11403-01

Southwest Research Institute, AP 33(615)-5142
11334

C. Corporate authors and conference names.

Figure 5. Index to Holdings, Vol. III, Pt. I, March 1969.

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Thermal diffusivity, elastomers-Strain effect
 #20625 On the thermal diffusivity of
 filled elastomers.

Thermal effect-Graphite/polyimide
 20450 Studies of the processing and
 the properties of high temperature resin/
 graphite fiber composites.

Thermal effect-Graphite/polyphenylquinoxaline
 20450 Studies of the processing and
 the properties of high temperature resin/
 graphite fiber composites.

Thermal effect-Injection molding
 20754 Structure development in
 injection molding acetal homopolymer.

Baudino, E.J.
 #20216

Bauer, D.W.
 21520

Bauer, R.G.
 21482 19231

Bauer, S.H.
 18902 19640
 20542

Baum, B.
 20729 19992
 20100 21460

Bell, C.L.H.
 20404

Bell, I.
 20342

Bell, H.V.
 #19720

Bell, V.L.
 19449

Belyaeva, N.A.
 #21161

Beacci, J.A.
 20404

A. The Subject Index

B. The Author Index

Massachusetts Inst. of Technology.
 #20614 #21230 #21232 #21231
 #21229 20376 20450 20449
 #18986 #19948 19336 19337
 19741 19679 19840

Massachusetts Univ.
 #20990

Materials Research Lab., Inc.
 #21031 19338

Materials Sciences Corp.
 #20991 20451

C. The Source Index

AF contract F33615-71-C-1468.
 Olin Corp.

#21013
 #19000

AF contract F33615-71-C-1490.
 Aerotherm Acutex Corp.

19235

AF contract F33615-71-C-1502.
 Rockwell International Corp.

#21239

AF contract F33615-71-C-1508.
 Hercules, Inc.

19778
 19314

AF contract F33615-71-C-1528.
 Bell Aerospace Co.

#20598

AF contract F33615-71-C-1533.
 Brooklyn Polytechnic Inst.

19273

APOSB-TB-74-0833.
 APOSB-TB-74-0883.
 APRPL-TB-71-130.
 APRPL-TB-73-112.
 APRPL-TB-73-6.
 APRPL-TB-73-94.
 APRPL-TB-74-42.
 APUL-TB-SBB-72-2.
 APUL-TB-69-38.
 APUL-TB-72-134.
 APUL-TB-72-146.
 APUL-TB-72-196.
 APUL-TB-72-199.
 APUL-TB-72-224.
 APUL-TB-72-234.
 APUL-TB-72-78.
 APUL-TB-72-90.
 APUL-TB-73-157.

Feb 74. #1277
 Mar 74. #21216
 Oct 71. #20282
 Jan 74. #20841
 Mar 73. #19674
 Dec 73. #19459
 Aug 74. #1537
 Mar 72. #19643
 Apr 69. #20166
 Mar 72. #19005
 May 73. #19156
 Jan 73. #19024
 Dec 72. #18788
 May 73. #19445
 Oct 73. #20545
 Sep 72. #19001
 June 73. #19661
 Nov 73. #20973

D. The Contract Number Index

E. The Report Series Index

Figure 6. Cumulative Index to Holdings, Vol. XI, 1974.

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5. The Report Series Index lists report series identification numbers and abbreviated descriptions of documents in alphabetical order by issuing agency abbreviation and first letters of the abbreviated description followed by the applicable document numbers.

2.2.3 Reasons for Present Format

The index developed into its present format for the following reasons. First, the PLASTECH document collection is open only to PLASTECH subject specialists, is non-circulating and is filed in accession number order. Second, speed of response to information requests has been a traditional measure of performance at PLASTECH. Third, the index was designed for easy manual use by subject specialists and this is still its principal mode of use. Fourth, the emphasis of the PLASTECH mission is on the properties and uses of materials and not on their chemistry, e.g. Epoxy/graphite - Thermal properties; Rotational molding - Polyethylene. Fifth, the index is to a manageable number of documents in a limited subject area. Sixth, the index was designed to be used without the intervention of a librarian or information specialist.

2.2.4 Problems with the Present Index

The PLASTECH index has been a successful manual index to a document collection and has performed well. There are, however, a number of problems with the index. See Appendix A for PLASTECH indexing rules.

- The present index is too big. The subject index for 1974 has 955 pages with over 25,000 index entries for 2,699 indexed documents.
- There has been a lack of control over synonyms and the use of singular vs. plural terms.

Ablation-Carbon/carbon
#19950 Ablation testing of carbon/
carbon in a high impact pressure arc heater
facility.

#21356 A discussion of Soviet Materials
technology.

Ablation-Carbon/carbon composites
#21514 Fabrication and properties
description of Avco 3D carbon/carbon
cylinder materials.

Ablation-Carbon/phenolic composite
#20202 Turbulent flow test results on
ablative carbon/phenolic composites.

Ablation-Carbon/Phenolic
#20200 Turbulent flow test results on
ablative carbon/plastic composites.

Abrasion resistance-Polyethylene
#20284 Development of low density
polyethylene insulation material with high
speed processability and high abrasion
resistance.

Abrasion resistance-Polyethylenes
#21264 Structure properties, and wear
resistance of polyethylene.

Acoustic emission-Composite
#20895 The fracture energy and acoustic
emission of a boron-epoxy composite.

Acoustic emission-Composites
#20827 A basic model for acoustic
emission from fiber-reinforced material.

Acoustic emission-Reinforced composite
#20827 A basic model for acoustic
emission from fiber-reinforced material.

- Standards for using commonly acknowledged abbreviations have not been followed in a consistent fashion.

Polystyryl chloride-Additives
21451 A polymeric flattening agent for control of surface gloss in poly(vinyl chloride).

NBT-Composites
#18991 A study of an infrared scanning system for nondestructive inspection of composites.

PVC-Additive
20739 Radiation-induced crosslinking of PVC in the presence of triallyl cyanurate.

Non destructive-Composites
#20020 Non-destructive testing and inspection applied to composite materials and structures.

PVC-Additives
20157 Vinyl polymers and ϵ -caprolactone polymers as low profile additives for unsaturated polyester molding.

Nondestructive testing-Composites
#21139 Nondestructive, thermal, and mechanical properties evaluations of composite heatshield materials.

Non destructive testing-Composites
20411 A feasibility analysis of the acoustic holographic interferometric concept for void detection in composite pressure vessels.

- Term use instructions for PLASTECH indexers have been ignored to a large extent. Examples of the instructions and their violations follow.

15. Specific terms excluded are:

Disregard
Material evaluation
Various plastics
Adhesive-strength
Glass fiber
Aerospace application
Application - Aerospace
Filament
Copolymer-Specific material
Thermal resistance
Microbiological degradation

Replace by
Testing
Plastics
Bond strength
Fiberglass
Aerospace
Aerospace
Fiber
Copolymer research
Heat resistance
Microbiological deterioration

Adhesive strength-Boron/polyimide
19953 Structural efficiency of boron/polyimide and carbon/polyimide laminated films.

Microbial degradation-Polycaprolactone
19747 Microbial degradation of polyesters: poly(caprolactone) degraded by *P. pullulans*

Adhesive strength-Carbon/polyimide
19953 Structural efficiency of boron/polyimide and carbon/polyimide laminated films.

Microbial deterioration-Cartons
#19728 Microbial deterioration of cartons for small arms ammunition.

Glass fiber-Degradation
19640 Fiber degradation in thermoset injection molding.

Aerospace application-Potting compound
#21030 Hydrolytic stability of potting compounds for electrical connectors.

Glass fiber-Electron microscopy
#19859 Manufacturing methods for high strength-high modulus glass fiber.

Aerospace applications-Adhesive bonding
#21155 Development of an adhesively bonded beryllium propulsion structure for the Mariner Mars 1971 spacecraft.

Adhesive bonding in the Fokker-VPW F-28 'Fellowship'
#21304

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Filament-Boron/Carbon/graphite
19652 Development and demonstration of
a low cost boron filament formation process.

Thermal resistance-Composites
#21296 Use of composite materials in
aircraft structures.

Filament-Carbon
19652 Development and demonstration of
a low cost boron filament formation process.

Thermal resistance-Fibers
#21285 A review of heat-resistant
fibrous materials.

- The continual violation of these rules has led to a great deal of redundancy which in turn has led to too few postings per term. A sample taken from the 1974 index gave a ratio of 1.2 document postings per index entry.

All of the errors and problems just listed fall into the general category of editorial problems. They can be eliminated and a number of recommendations to this end will be found in Section 5.1.

2.3 Evolution of DDC Indexing

2.3.1 Historical Development

The Defense Documentation Center (DDC) is the current manifestation of the Department of Defense (DOD) effort to keep its community informed about science and technology as they relate to defense needs. Formed from the old Armed Services Technical Information Agency (ASTIA) DDC committed itself to the use of automated systems for information handling in 1959. The first phase established computer control over the cataloging data for its collection of technical reports. By the time this task was begun DDC's report collection already numbered 700,000 documents and was reported to be growing at a rate of 30,000 reports annually [3].

2.3.2 The Conversion to Automated Systems

One facet of the conversion from manual to automated systems was the change of the method of subject analysis and control. The original method used at ASTIA was subject heading classification. As has been the case with information storage and retrieval systems in general the inherent rigidity of subject classification had to be abandoned in favor of index terms or descriptor coordination.

The most important step in this conversion was the development of an indexing vocabulary which could be assigned to documents and then be manipulated during the retrieval process. The initial vocabulary was developed from

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ASTIA's subject headings and with editing a list of 7000 terms along with cross references, descriptor groups and subject fields was published in 1960 as the "Thesaurus of ASTIA Descriptors [4]."

2.3.3 Current Indexing Practice

The achievements cited above were significant in the history of information retrieval and helped pave the way for such developments as the Thesaurus of Engineering Terms [5] and the Thesaurus of Engineering and Scientific Terms [6]. The current version of the vocabulary list used at DDC is the DDC Retrieval and Indexing Terminology [7].

The next major phase in the development of DDC was the design and employment of automated language processing methods for indexing its technical reports. The conversion to machine-aided indexing (MAI) has been made and refinements of this system are continuing [8,9,10].

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3. IAC Service Support for PLASTE

3.1 Introduction

This section will review the implementation of IAC (Information Analysis Center) service support for PLASTE and discuss: the accommodations for PLASTE indexing provided by DDC; the general features of the Remote Terminal Input Subsystem (RTIS); the use of the RTIS and conclude with a discussion of the options available to PLASTE for utilizing the indexing after it is stored. The discussion will be limited to these areas and will exclude other services and capabilities offered or available in the support program.

3.2 Information Analysis Center Input Description

3.2.1 Data Element Categories

When PLASTE begins to input new document records via the RTIS (See section 3.3) two basic categories of citation data will be transmitted. Category 1 input (Figure 7) will consist of file records for documents which are unique to PLASTE. Category 2 input (Figure 8) will consist of citations to documents which have already been accessioned by DDC and for which cataloging data already exists. To avoid redundant cataloging of the category 2 documents, PLASTE will add three data elements: the PLASTE accession number (Field 42), the document type, i.e. hard copy or microfiche (Field 43) and the PLASTE subject terms (Field 44). Instructions for the input of these data elements are given in reference 11.

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<u>Field No.</u>	<u>Name</u>	<u>Field No.</u>	<u>Name</u>
1	AD Number	21	Supplementary Note
6	Title (Unclassified)	22	Distribution/Availability Statement(s)
9	Descriptive Note	27	Abstract (Unclassified)
10	Personal Author(s)	30	Annotation
11	Report Date	33	Distribution/Availability Codes
12	Pagination	34	Serial Code
14	Source Series Numbers(s)	35	Corporate Author Code
15	Contract Number(s)	42	IAC Document Number
18	Monitoring Agency Acronyms(s)	43	IAC Document Type/Location Code
19	Monitoring Agency Series No.(s)	44	IAC Subject Terms

Figure 7. Category 1 Data Elements

<u>Field No.</u>	<u>Name</u>
42	IAC Document Number
43	IAC Document Type/Location Code
44	IAC Subject Terms

Figure 8. Category 2 Data Elements

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3.2.2 Field 44 Description

Field 44 has been designated by DDC as the storage site for IAC subject terms. A description of Field 44 characteristics follows. For a description of the other data elements used for DDC cataloging, see Appendix B.

1. Field 44 is optional for PLASTEK input but required for normal DDC processing. This means that DDC's editing programs will produce an error message if there is no data in the field after an input transaction has been made.
2. The maximum number of characters allotted for Field 44 is 600. Any number of index terms totaling up to 600 characters may be input to this field.
3. A comma and a space are used in combination to delimit index terms.
4. Index terms may not be individually modified or added to Field 44 during the record update process. The entire set of terms must be contained in any input transaction.

3.3 RTIS Description

3.3.1 Design Philosophy

PLASTEK input of document citation data to its file will be accomplished via the Remote Terminal Input Subsystem (RTIS) [12]. The RTIS will allow PLASTEK to create, build, modify and control access to a unique subset of the DDC Master File. The system does not allow users to modify directly a master file record but does allow data to be entered into an off-line batch update process.

The design philosophy for the input subsystem was that it parallel the system's retrieval functions. Consequently, many of the command functions are related. This makes it necessary for the terminal to be operating in the RTIS mode for input commands to be recognized. Likewise the terminal must be switched to the retrieval mode before retrieval functions can be resumed.

3.3.2 RTIS Input Cycle

Data for input is keyed into a buffer storage area via the terminal keyboard and is displayed simultaneously on the terminal's cathode ray tube (CRT) screen. The terminal's editing capabilities then allow the keyed data to be edited visually. Once the input step has been completed and the entire item visually edited, a termination command initiates the transfer of the item from temporary drum storage to the main computer which then performs formatting and editing functions based on software parameters designated for the file. The remote user is then notified on a field-by-field basis whether the item has passed or failed the software checks. When the item has passed these checks another command transfers the item into the IAC's file for mass storage.

For any subsequent modifications to data fields within an item, it must be recalled from mass storage to the terminal storage area. Then the user may modify the item through the terminal keyboard.

PLASTECS input will be done in two modes. For Category 1 input data entry will be a new item transaction. For these items, PLASTECS will be provided with a set of AD numbers. Category 2 input will be file maintenance transactions to existing DDC records.

The entry of index terms into Field 44 will be a special case. In order to minimize the amount of storage required for index terms PLASTECS will input terms in their original form, e.g. A-B. The terms will remain in the A-B format in the DDC Direct File. This will be the file from which PLASTECS records are displayed and from which PLASTECS's printed outputs are generated. When the terms are posted to the DDC Inverted File, they will be posted as A, B. Each half of the paired term will appear as a uniterm on that file. Consequently, all searching of Field 44 will use Boolean operators to reconstitute the A-B format.

3.4 PLASTECS Utilization of Field 44

3.4.1 Field 44 Capabilities

The utilization of the index terms stored in Field 44 will provide PLASTECS with the following capabilities for its file: on-line interactive searching, search result display and hard copy generation of these results

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and the generation of hardcopy indexes. The discussion of these capabilities will be based on the present indexing used by PLASTEK and the service that DDC can provide given this kind of indexing. The storage of index terms in the DDC Inverted File will be the same as DDC normally uses, while the term storage on the Direct File will allow the term format preferred by PLASTEK for its printed products.

3.4.2 Search Options

In searching the PLASTEK file all search options that are available for searching the DDC Technical Reports File will be available to PLASTEK with the present exception of the hierarchy and weight options. PLASTEK will have the capability of establishing hierarchical relationships in the future because of the unit concept (posting terms) in the Inverted File. Terms also have not been weighted in the past and so this option will only be available in the future. A more detailed look at search options is available in the Defense RDT & E On-Line System Terminal Operator's Manual [12].

The masking (truncation) option allows the use of truncated terms in searching. When using this option, the search is broadened by using the first several characters of a term plus a symbol. The search will then record as "hits" all terms that begin with those characters. This option will work the same for both the DDC and PLASTEK files.

The weighted term option is one that PLASTEK may be able to use in the future. This option was designed to improve search specificity by indicating with an asterisk those terms which are primary descriptors of a document's content. PLASTEK has not used this in the past and so this option is unavailable for searching at this time.

The term role option utilizes a symbol plus a 2-digit role code identifier which forces the search to address a specified field for data. When searching the PLASTEK file, these codes will be used at all times to access the IAC display/print fields 42, 43 and 44.

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The final option is the accession number cut-off option. This allows the searcher to specify the accession number range in which he wishes to search. This will work for both DDC and IAC accession numbers.

3.4.3 Index Generation

The generation of indexes to the PLASTECH file will be another use made of Field 44. As new document citations are added to the file and announced in the PLASTECH Document Announcement Bulletin (DAB) regularly issued indexes to the DAB will be published. As presently envisioned the subject portion of the index will appear in much the same format as the Technical Abstract Bulletin (TAB) indexes. The difference will be that for PLASTECH each index entry will be posted twice, the second time in the transposed form.

3.4.4 Search Result Output

The methods for generating output of search results are the same for either DDC or IAC files. Hardcopy of search results may be made on the terminal printer. Off-line printing of bibliographies is not available to PLASTECH at this time but is planned for the future.

3.4.5 CRT Display of PLASTECH Records

The display of PLASTECH document citations on the terminal CRT will conform to the format used for DDC Technical Report File citations. The only difference will be that the supplemental IAC fields will be available for display only to the IAC for whom they are designated. This and other safeguards have been built to protect the proprietary nature of the IAC's file. Unlike DDC, the DOD information analysis centers are under instructions to sell information to requestors in order to partially offset operating costs.

4. The Future of PLASTE^C Indexing

4.1 Introduction

The purpose of Section 4 is two-fold. The first part will examine in detail the present method of indexing, its purpose, its advantages and disadvantages, its effects on present PLASTE^C products and any adjustments required for joining the DDC system. The second half will consider indexing aids or procedures which might improve indexing consistency.

4.2 Objectives of the PLASTE^C Index

For some time the purpose of the PLASTE^C index has been as a desk-used companion to the Document Announcement Bulletin (DAB). The DAB announces PLASTE^C acquisitions in a format consisting of a citation, abstract and index terms in accession number order (See Appendix C). The index provides access to the DAB by subject, personal author, corporate author, contract number, and by report series identification numbers. The index is a manual tool designed primarily for those with access to the document collection. Within the last several years, machine searches in the batch mode have been made for sale to users. For the purposes of this report it is assumed that PLASTE^C will continue to exercise their proprietary control over this file and that the greatest use of the PLASTE^C index will be made by the center's subject and information specialists.

4.3 PLASTE^C Indexing vs. DDC Indexing

The PLASTE^C index was examined briefly in Section 2 and problems associated with a lack of editorial control were listed. None of the problems were of a major or fundamental nature and recommendations will be made for rectifying them. Now the examination will compare PLASTE^C's method of indexing to that of DDC. Where documents are accessioned by both organizations, the argument might be made that these items are being indexed twice when once might do. The response to this argument will look at the purpose, philosophy and audiences served by the respective indexing schemes. Retrieval system performance will not be tested. An experiment of this type would involve the reindexing of a part of the PLASTE^C document collection along with the performance of a number of retrieval tests. Neither funds nor time

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are available for an investigation of this type though in the future such a test might prove beneficial.

4.3.1 PLASTECH System Easier to Use

Many information systems have been designed so that the system's user must go to a librarian or information worker who then allows the user access to the system by performing tasks which release the stored information. On the other hand, the PLASTECH system has been designed so that a user needs only some brief simple instructions before being able to access the system successfully on his own. The PLASTECH user needs to know:

1. The organization of the subject index, i.e. that each index entry is listed by the term to the left of the hyphen and by the term to the right. For example, "Polyethylene - Thermal degradation" is entered also as, "Thermal degradation - Polyethylene."
2. The document identification procedure, i.e. that index postings are accession numbers followed by a one-sentence descriptive statement of the document's content and that the collection is organized in accession number order.

Information retrieval from the DDC system, on the other hand, requires the intervention of an information specialist in most cases. Index terms have to be manipulated in a prescribed manner in order to identify and define concepts in which the user is interested. This will be seen more clearly in the discussion below.

4.3.2 Audiences Served by Respective Indexes

An information system that is simple to operate for an unaccompanied user meets the objectives for the PLASTECH system given in Section 2. PLASTECH has been able to maintain this simplicity of use largely because of the narrowness of the audience served. The user who seeks information from the PLASTECH collection is interested in something to do with plastics. Consequently, the indexing is narrow in scope and oriented toward knowledgeable users.

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When this audience is contrasted with the one that DDC must serve, differences in service and the reasons for them begin to be apparent. DDC has been designated to serve the entire DOD scientific and technical community. Thus the indexing of its document collections must be capable of responding to a wide variety of disciplines and users and this prevents it from focusing on specific disciplines. The two approaches are illustrated in Figure 9 where terms for documents mutually indexed by PLASTECH and DDC are shown side by side.

4.3.3 Differences in the Two Indexes

The examples illustrate some of the differences between the two systems. Because DDC serves the entire DOD community, it has to attempt to give equal emphasis to all aspects of a given report. In Document B, a user may be interested more in the penetration abilities of a 14.5 mm API projectile than in the ability of a fuel tank to seal itself after being hit. DDC has to anticipate this need and thus one of the index terms is "14.5 mm ammunition." A user seeking such information would never come to PLASTECH and PLASTECH's indexing for the document reflects that fact. Document C also illustrates this difference. PLASTECH indexing shows that the document is not only about laminated plastic windshields but gives the materials from which the laminate is constructed. On the other hand, DDC's terms get no more specific than to indicate that the windshield is a laminate.

4.3.4 Vocabulary Differences

The contrasts just illustrated lead to the next point which is that the vocabularies from which the documents are indexed are a reflection of the purposes for which they are designed. Thesauri and vocabularies such as TEST and DRIT are designed to cover the broad spectrum of the engineering and scientific community and thus cannot supply an abundance of terms in any one subject area. In contrast, the PLASTECH vocabulary is designed to identify only plastics information in a document and to ignore the other information it may contain (See Appendix D).

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Rain erosion-Flouroelastomer; Heat resistant-Flouroelastomer;
Heat resistant-Elastomers; Adhesive-High temperature; Adhesive-
Epoxy; Flouroelastomer-Radar transparency; Boots-Elastomeric;
Reinforcement-Various; Elastomers-Reinforcement;

PLASTEK Indexing

DESCRIPTORS: (*RADOMES, EROSION RESISTANCE),
(*ELASTOMERS, RADOMES), THERMAL STABILITY, LEADING
EDGES, SUBSONIC FLIGHT, RAIN EROSION, ADHESIVES,
REINFORCING MATERIALS, EPOXY RESINS, COMPOSITE
MATERIALS, POLYIMIDE RESINS, FLOURIDES, ELECTRICAL
CONDUCTIVITY, FIBERGLASS, REINFORCED PLASTICS,
COATINGS, TRANSPARENCE, RADAR SIGNALS,
PERFORMANCE (ENGINEERING), PHYSICAL PROPERTIES,
MECHANICAL PROPERTIES
IDENTIFIERS: *FLOUROELASTOMERS, BOOTS (RADOMES)

Document A. DDC Indexing

Fuel tanks-Self sealing; Foams-Void filler; Fuel tanks-
Elastomeric; Foam-Polyurethane; Ballistic resistance-Elastomeric
fuel tank

PLASTEK Indexing

DESCRIPTORS: (*FUEL TANKS, SEALS), INCENDIARY
AMMUNITION, ARMOR PIERCING AMMUNITION, PROJECTILES,
PERFORMANCE (ENGINEERING), VULNERABILITY, BLADDERS,
FOAM, RIGIDITY, AIRPLANE PANELS, SIMULATION, ALUMINUM
ALLOYS, RUBBER, POLYURETHANE RESINS, NYLON, HYDRAULIC
EQUIPMENT, LEAKAGE (FLUID), FIRES, INSTALLATION
IDENTIFIERS: 14.5MM AMMUNITION, *SELF SEALING
FUEL TANKS, ALUMINUM ALLOY 2024

Document B. DDC Indexing

Windshield/aircraft-Super sonic; Windshield/laminated plastics-
Acrylic/polycarbonate; Windshield-Acrylic; Windshield-CR 39
(allyl diglycol carbonate); Aircraft/transparencies-Plastics

PLASTEK Indexing

DESCRIPTORS: (*WINDSHIELDS, LAMINATED PLASTICS),
(*LAMINATED PLASTICS, AERODYNAMIC HEATING),
SUPERSONIC AIRCRAFT, WIND TUNNEL TESTS, SUPERSONIC
FLOW, HIGH ALTITUDE, DISTORTION, VISIBILITY, WIND
TUNNEL MODELS, HEAT TRANSFER, TEMPERATURE, PRESSURE,
SURFACE PROPERTIES, SHOCK WAVES, TWO DIMENSIONAL FLOW,
AEROTHERMODYNAMICS, DETERIORATION, BUBBLES, CRACKS,
LAMINATES, SEPARATION, EDGES, AIRCRAFT CANOPIES
IDENTIFIERS: SHADOWGRAPHS

Document C. DDC Indexing

Figure 9. DDC Terms Compared to PLASTEK Terms

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4.4 Disadvantages of PLASTEK Indexing

Disadvantages in the present indexing system must be considered from two perspectives; those which existed prior to the implementation of DDC service support and those which might arise as a result of the support effort. In choosing precoordinated indexing, PLASTEK sacrificed the establishment of hierarchical relationships. Other disadvantages such as too many synonyms, lack of term standardization, poor posting to term ratio, etc. are not inherent shortcomings of the system but rectifiable problems to be addressed in Section 5.1. With the reformatting of PLASTEK terms in the Inverted File into unit concepts, it will now be possible to begin establishing hierarchical relationships between these terms. Also using the Inverted File as a source it will be possible to generate term lists which can then be used to create term hierarchies. In this way, the chief disadvantage of precoordinated indexing will be eliminated. This will improve PLASTEK capabilities by having the unit concept in machine storage as well as the precoordinated term. The first will permit more sophisticated machine searching and the latter will provide greater specificity in manual searching.

4.5 New Indexing Aids and Procedures

Suggestions will be made later in this report for improving editorial control over the present indexing using the tools and practices currently available to PLASTEK's indexers. This section will first look at new or alternative aids and procedures which might alleviate the central problem, indexing consistency.

4.5.1 Thesaurus

The term "thesaurus" often is used to describe any prescriptive vocabulary list. Here it will be used in a narrower sense of the word as in the description given in TEST,

" . . . this Thesaurus deals with single concepts and then groups these into related areas. The names of the concepts form the main entries in this Thesaurus. These entries have been treated in such a way as to emphasize uniqueness and reduce . . . ambiguity in terminology created by such factors as synonyms, homographs, and differences in spelling word forms and hierarchical treatment." [6]

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The reason for confining the definition in this way is to illustrate that a thesaurus cannot be constructed using the paired term approach while a vocabulary list can. In addition, a term list would not group related concepts together and so will be considered as a separate tool later in this study.

A thesaurus as defined above can now be developed by PLASTECH. The unit-term format in the DDC Inverted File will make a thesaurus possible and desirable as a tool for improving search strategies as well as vocabulary control.

4.5.2 Supervision

This aid to indexing consistency will be mentioned again later. Supervision of indexing can vary from spot-checking to a 100% review of the indexer's work. Supervision will play a role in improving PLASTECH's indexing mostly in providing feedback to the indexer so that he can profit by his mistakes. As such supervision will be an adjunct to any physical aids that may be adopted by PLASTECH.

4.5.3 Style Manual

PLASTECH already has a set of style rules for indexing. The recommendation of this report is that the present set of style rules be reviewed for currency and to see that it contains; a set of indexing rules, mandatory indexing requirements e.g. "for material evaluation use testing" and a policy on the depth of indexing required. Also suggested for inclusion is a checklist to guide the indexer. The list would codify the rules as well as indicate other parameters for term selection such as punctuation, term length, etc.

4.5.4 Dictionaries and Handbooks

In effect the indexer is provided with a reference library to assist in term selection. This category of aids would be of limited use since the primary source of terms is the text of the document. In addition, the indexer will have recourse to PLASTECH's subject specialists when in doubt about term selection.

4.5.5 Indexing Forms or Worksheets

Worksheets will continue to be used when the system goes on-line. No instructions for indexing are contained on the current worksheet although this idea has been used successfully by other agencies. The PLASTEK worksheet is in the process of being redesigned to conform to new requirements and some instructions or guidance may be used on the form.

4.5.6 Equipment

This category includes any devices of a manual or semi-automatic nature which can assist the indexer. Examples might be microform readers for a filmed vocabulary list, a rotary card file or a dictating machine. Microform storage would presume a controlled vocabulary list and a slow rate of change since re-filming and equipment costs could not be justified otherwise. Also, terms would have to be easily accessible which implies an automated retrieval capability for the reader. Rotary files can save time in locating appropriate terms. A desk model file of this type could be used to store a list or thesaurus and would probably be more effective than a paper copy particularly if the list were large. A dictating machine could be used to record terms for later transcription by secretarial personnel which should improve the indexer's speed.

4.5.7 Precedent File or Scope Notes

A precedent file would contain in descriptor order information as to how certain terms have been used in the past. In many cases, a set of style rules would mention most of the exceptions though a file of this sort would certainly help in revising style rules.

4.5.8 Vocabulary List

A vocabulary list is differentiated from a thesaurus in that it would simply be an alphabetical listing of terms used in indexing. Its usual purpose is to provide the indexer speedy access to the authorized terms for a system. The list can be either prescriptive or suggestive in nature and can contain such information as scope notes, frequency of use postings, etc. This is an interim aid that should be used at PLASTEK and it will be discussed in Section 5.2.

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5. Recommendations for Present PLASTECH Index

5.1 Short-run Improvements

Section 4.5 discussed indexing aids or devices which are used generally in this kind of work. We will now look at specific recommendations both short-range and long-range which can improve the consistency and quality of PLASTECH indexing. There are several immediate steps that can be taken.

1. The style rules for indexing should be updated to reflect new field parameters for the DDC input subsystem. In particular, term length and punctuation requirements will be different.
2. PLASTECH should insist that indexers consult previous subject indexes in selecting candidate terms for new documents. This should begin to promote more consistent use of descriptors.
3. PLASTECH should train indexers more thoroughly in the future. Specifically, a new indexer should have at least one or two practice sessions in which documents indexed by the trainee would be reviewed by PLASTECH subject specialists to help adjust new indexers to the PLASTECH system.
4. Indexer training should not stop. On a periodic basis, the indexing of a sample of PLASTECH documents should be reviewed by PLASTECH subject specialists to provide feedback to the indexer.
5. Indexers should begin to create precedent files and scope notes. These would aid the indexer in performing the task as well as provide valuable guidance for long-range improvements.
6. Because the indexing will now be done at PLASTECH, the final recommendation is that the indexer take advantage of ready access to PLASTECH's subject specialists. It is they who are the chief users of the indexing.

5.2 Long Range Improvements

The short-range recommendations made above are primarily conditions that should exist in a well managed indexing operation. They are conditions also

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which should exist prior to the adoption of any new indexing aids or procedures. Because PLASTECH will continue with this kind of indexing and in light of the present problems with the index, the most significant improvements will come from a more firmly controlled selection of terms during the indexing process. The tool for this situation is a vocabulary list.

5.2.1 Vocabulary List

To meet the above objectives, a vocabulary list would have to meet the following suggested list of criteria. See Figure 10.

1. The list should be usable by both indexer and searcher.
2. There should be a capability for regularly updating the list with new terms being interfiled during the update process.
3. The frequency of term use should be posted adjacent to the term and be updated regularly.
4. Scope notes or definitions for difficult terms should be readily accessible.
5. All terms should be listed in their original as well as their transposed forms.

5.2.2 Vocabulary Project Outline

The first stage in creating a vocabulary list would be to establish a set of rules and conventions for the list. The basic purpose of these rules would be to guide the indexer in term selection. Secondly, they would assist the searcher in the selection of search terms. These conventions would cover such areas as defining what a term would be for the PLASTECH system. A rule for terms would specify such parameters as nomenclature inclusion, term length, the kinds of words that can be used as terms, etc. Likewise, rules would have to be established for term selection such as

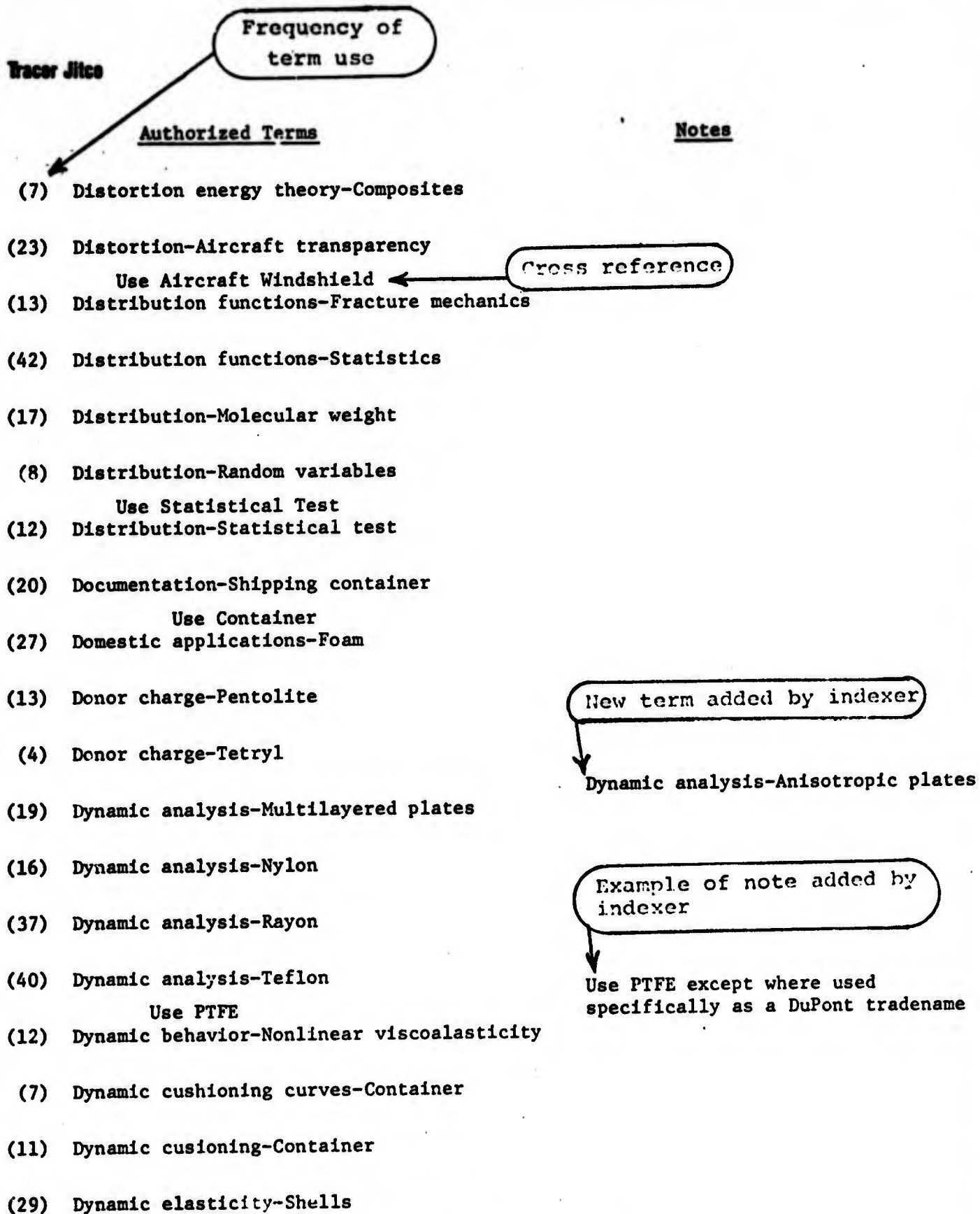


Figure Sample of Proposed Vocabulary List.

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singular or plural usage, synonyms, punctuation and abbreviations. Another set of rules would control the creation of cross references. Word relationships that require cross references would have to be identified and defined, and a technique for displaying them would have to be created. Next, a convention for alphabetization would have to be selected and spelled out to insure consistent word orders. Lastly, a set of procedures and criteria for adding new terms to the vocabulary would have to be developed. This would make the list grow in an orderly fashion.

After developing the conventions, the actual work of creating the list would begin. The first step would be to create a list of candidate terms. The logical source would be the vocabulary created by PLASTECH to date. Because this vocabulary is machine stored, a list of terms should now be generated along with a posting giving the number of times each term has been used. This would be a valuable aid in term review and selection.

A team of subject and information specialists familiar with the needs of PLASTECH would then begin the process of term selection using this list as source material. The team using the conventions they had developed earlier would select terms, provide definitions or scope notes for difficult or ambiguous terms, create cross references where necessary and select any standard abbreviations to be used in the vocabulary.

Once the initial list of candidate terminology had been selected, these same or additional specialists would refine the list in a final edit and review session. The use of additional specialists is recommended here to help counteract biases which may have developed during the initial sessions.

The last stage in the project would be to consult with those members of the PLASTECH staff who would use the list and select a format which would satisfy them as well as fulfilling the criteria set out at the beginning of the project.

6. Conclusions

6.1 General Conclusions

The conclusions to be drawn from this report are that PLASTECS present system of precoordinated indexing should not be abandoned, that an effort to improve the quality of the indexing is necessary, and that a controlled vocabulary list would make the most significant contribution to the PLASTECS system at this stage. The list could be prepared in short order and provide an interim tool for indexing until a microthesaurus could be prepared.

6.2 Specific Conclusions

6.2.1 Capabilities with the New System

As was indicated in the report, DDC has informed PLASTECS that the storage and retrieval capabilities that are available to PLASTECS using uniterm indexing are also available using PLASTECS present method of indexing.

6.2.2 Uniterm vs. Paired Term Indexing

The comparison of uniterm vs. paired term indexing has shown that the paired term system:

- is suited to PLASTECS indexing mission, in particular, the mating of materials with properties and/or applications.
- is familiar to PLASTECS users.
- has developed no fundamental problems in the past.
- has given no indication that major problems will develop in the future.

6.2.3 Effect of PLASTECS Indexing on DDC

DDC has assured PLASTECS that continuing with the paired term concept will not affect or degrade in any way the printed products such as the DAB, the index to the DAB or literature searches.

6.2.4 Proposed Improvements

The lack of consistency in term selection has been identified as the major problem in the indexing of PLASTECS collection. Short-run recommendations have

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made which will improve consistency. For an interim solution to this problem, a proposal for a vocabulary list has been made.

6.2.5 Final Comments

It is hoped that this report will supply the basis and justification for the creation of a controlled vocabulary list for PLASTECH. The author feels that such a list would be the most significant short-term improvement for PLASTECH's indexing.

One of the original purposes of this report was to look into the desirability and feasibility of a microthesaurus of plastics terms. With the capabilities offered by DDC and the features of the present indexing system, a microthesaurus is desirable at this time but its cost of preparation can be programmed over a longer period of time. In the interim the prerequisite controlled vocabulary can serve as a satisfactory substitute.

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APPENDIX A

STYLE RULES FOR USE IN INDEXING

1. The Index of Subject Terms will continue to serve as an interim authority list pending the development of a suitable Thesaurus which is planned as a separate task assignment subject to the availability of funds.
2. Subject entries are listed using the application or property as the primary point of access; materials are only included as the secondary part of the term. Ex: Aircraft part - FRP/epoxy. A separate task assignment will develop a program for inverting and interfiling secondary terms with primary terms.
3. Index terms must not exceed 45 spaces which is the maximum number allotted per machine entry. If a term does not fit, words must be rearranged or abbreviated. All abbreviations should be listed in the standard list of abbreviations (see Appendix).
4. Terms are singular except for collective nouns.
5. List all terms in the common, non-inverted form. Ex: Hand grenade. Moisture absorption, etc. However classes of certain items may be inverted to achieve generic grouping. Ex: Detonator, electric. Detonator, stab. Adjectives are used as a first word of a term only for common word combinations such as: Blowing agent.
6. Combined terms use ampersand (&); for materials use slash (/). Ex: Humidity & temperature. Nickel/Epoxy.
7. Authors' names are listed last name first, then initials (without space) after the comma and a space. Ex: Anzalone, A.M. First names are not to be written out in full. Names beginning with De, Mc, O, Van, etc. are written without space or punctuation.
8. The first character must always be a letter, never a number. In military nomenclature, designation comes before name. Ex: M14 Springfield rifle.
 - a. In designations, numbers are spaced to fall into their correct column position. Ex: T 7 0 it will line up with larger numbers. Ex: T2055.
 - b. Abbreviated designations and units are not punctuated. Do not use: FA Mixture 70, delay 1 sec. Use: FA Mixture 70 delay 1 sec.

9. Every word must be followed by either a space or a dash. If either part of a bound term contains more than one word, a decision must be made not to use these two words alternately as a bound term. Ex: Adhesive tape - Electrical; Adhesive - Tape. Should compliance with this rule introduce grammatical error or ambiguity, the term must be recorded so that the rule is satisfied. For example, when attempting to index "Adhesive tape: it was found that the word adhesive had been used with a dash following it. To have followed previous procedure would have yielded the term "Adhesive - Tape" which differs in meaning from the term Adhesive tape. Therefore it was necessary to reword the term to "Tape - Adhesive".

10. Dashes are used between parts of a bound term; commas are used to separate modifiers from terms when generically listed in the inverted form; slash is used to separate materials used in combination or composites: Ex: Asbestos/phenolic.

11. In terms describing material combinations, non-plastic elements are listed before plastic elements. Order within each group is by alphabetization: Ex: Ceramic/glass/epoxy. Exception to rule: FRP is always listed first. Ex: FRP/acrylic.

12. Low frequency categories of applications are indexed under the term application. Ex: Application - Toothbrush. Significantly large categories are indexed under the subject term. Ex: Rocket motor case - FRP/phenolic. Items which have applied military use are listed under "Military application-". Similarly those terms which have medical use are listed under "Medical application-".

13. Compatibility - only documents discussing compatibility in conjunction with propellants or explosives will be indexed under this term. All other documents referencing interaction between plastics and other materials will be indexed under chemical resistance, oil resistance, acid resistance, etc.

14. Thermal stability - only documents discussing both hot and cold stability will be indexed under this term. Otherwise use high temperature, low temperature, cryogenic temperature, etc.

15. Specific terms excluded are:

<u>Disregard</u>	<u>Replace by</u>
Material evaluation	Testing
Various plastics	Plastics
Adhesive-strength	Bond strength
Glass fiber	Fiberglass
Aerospace application	Aerospace
Application - Aerospace	Aerospace
Filament	Fiber
Copolymer-Specific material	Copolymer research
Thermal resistance	Heat resistance
Microbiological degradation	Microbiological deterioration

16. Control terms used in Index.

- a. ZZ CONFERENCE-70 used for conference papers inputted into system and having a date between May 1969 and May 1970.
- b. ZZ CONTROLLED-C,S,P, USGO, FOUO, DOD, NOFORN, ETC. indicate security or other classification restrictions.
- c. ZZ UNLIMITED these documents have no distribution restriction.

17. No space is used when the dash serves as a hyphen. Ex: Navy project N-21-123.

18. Use space when the dash is used as a dash. Ex: Clip - see fastener.

DATA ELEMENT DESCRIPTIONS

Reproduced from best available copy.

Field Number	Name	Field Lengths (Characters) Min. Max.	Character Type	Requirement Type	Description/Format
1	AD Number	8 9	AN	M	The AD Number is composed of two portions: (1) a digraph, which corresponds to a type of transaction code, and (2) a uniquely assigned serial number for ADP and document processing and control.
	(Transaction Type Prefix)	2 2		M	The valid 2-character alpha prefixes (digraphs) are: AD CA CD CI CE
	(Serial)	6 7	AN	M	The serial portion of the AD number is either 6 numeric digits, or, starting with TAB 75-01, 6 numeric digits preceded by a single alpha character, i.e., D123456

For a new IAC Category 1 record, field 1 would be formatted as:
AD0987654

Field Number	Name	Field Lengths (Characters)		Character Type	Requirement Type	Description/Comment
		Min.	Max.			
6	Unclassified Title of Report	5	450	A, N	R	The full, unclassified title of the report, or the notation NO TITLE. Special characters as defined in Section VIII are permitted. All input must be machineable therefore, data such as subscripts, exponents, chemical and mathematical equations or formulas, Greek letters, etc., must be verbalized. See Section VIII for examples and instructions. (Upper and lower case letters recognized.)
9	Descriptive Note	10	120	A, N	0	A descriptive phrase that denotes the type of report without repeating the title - where applicable, it contains the serial number and period covered. (Upper and lower case letters recognized.)

Examples:

- FINAL REPORT
- QUARTERLY RPT NO. 6
- ANNUAL REPORT
- PROGRESS RPT NO. 4,
- 1 Jan - 31 Mar 75
- EVALUATION
- INTERIM REPORT

Field Number	Name	Field Lengths (Characters)		Character Type	Requirement?	Description/Format
		Min.	Max.			

10	Personal Author Name(s)	3	375 (RTIS) 754 (pre-edit)	AL	0	A maximum of 5 personal authors names may be entered. Enter the names in normal order. Do not enter titles, Sracs, honoraries, etc.; although suffixes such as Jr., Sr., or III are acceptable. A semicolon is used as a field separation between authors names, a space follows each name component, a slash immediately precedes each last name, and there is no space between the field separator and the succeeding name. No punctuation or separation is needed after the last entry. (Upper and lower case letters recognized.) Example: JOHN J. / JONES ; E. I. / DU FONT, III ; JOHN QUINCEY / SMITH, JR. ; L. VON / BELTHOVEN
11	Date of Report	4	9	AD	03	The date on which or as of which the report was prepared or published. Enter in the day, month and year order, without punctuation. The month is abbreviated to the first three characters. When the month is present, only the last two digits of the year are entered. Examples: 10 JUN 75 9 JUL 73 OCT 74 1975

Field Number	Name	Field Lengths (Characters)		Character Type	Requirement 2 Type	Description/Format
		Min.	Max.			
12	Pagination	1	4	N	0	Up to four numeric digits describing the number of pages in the report.
14	Source Series Number(s)	1	70 (35 each)	N/A	0	The series or report number(s) assigned by the originator as noted on the report. A maximum of two may be entered separated by a comma and a space. Neither may exceed 35 characters. Example: GMS-TDR-60, GMS-TDR-61
15	Contract Number(s)	5	70 (35 each)	N/A	0	The contract and/or grant number(s) under which the work described in the report was accomplished. A surrogate such as a DARPA number also may be entered. Up to two numbers may be entered, with a maximum of 35 characters for either, separated by a comma and a space. Example: F33615-72-C0001, NONR-1633C
18	Monitoring Agency Acronym(s)	2	40 (20 each)	N/A	0	Fields 18 and 19 are used in conjunction to form the monitoring agency report numbers. Do not enter data for field 18 or 19 if both are not present to provide a complete Report Number. Field 18 contains

Field Number	Name	Field Lengths (Characters)		Character Type	Requirement Type	Description/Format
		Min.	Max.			

a comma) which are needed to format the report number may be used.
Example:

CTR-72-26, TR-74-192-VOL-3

21	Supplementary Note	10	600	A/N	0	This field is for descriptive information about the report, or its origin, sponsorship, or availability not provided for in other fields, such as conference or symposium references, translation notes, or thesis notes. (Upper and lower case letters recognized.) Examples:
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SEE ALSO AD123455

PRELIMINARY REPORT ON

PREPARED IN COOPERATION WITH

TRANS. FROM (OR BY)

CONTINUATION OF

22	Distribution/Availability Statement	5	400	A/N	R	This field is to contain up to three narrative statements describing the distribution limitations pertaining to or availability of the report. The field complements the <u>Distribution/Availability Code(s)</u> entered in field 35. Data are free-flowed without specific subfield separation. (Upper and lower case letters recognized.) (See Section VIII for special instructions specific to the use and entry of <u>Distribution/Availability Statements and Codes.</u>)
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Field Number	Name	Field Lengths (Characters) Min. Max.	Character Type	Requirement Type	Description/Format
27	Abstract	5 1800	A/I	0	A brief unclassified factual summary of the most significant information about or contained in the report. Indicate also if the report contains a significant bibliography or literature survey. All abstracts must end with a parenthetic remark which as a minimum contains a designation of the IAC which generated or modified the abstract -- For example (AUTHOR, MODIFIED-PL) or (NT). All input must be machineable; therefore, subscripts, exponents, chemical and mathematical formulas, Greek letters, etc., must be verbalized. See Section VIII instructions on verbalization and use of special characters. (Upper and lower case letters recognized).
30	Annotation	5 450	A/I	0	A concise statement of the content or subject of the report to supplement the report title. See Section VIII instructions for verbalization and use of special characters. (Upper and lower case letters recognized.)

Field Number	Name	Field Lengths (Characters)		Character Type	Requirement Type	Description/Format
		Min.	Max.			
33	Distributive / Availability Codes	1	10	I	R	This field may contain up to three numeric codes signifying the Distribution Limitations/Availability of the report. Entries are one or two digit numbers separated by a comma and a space. The narrative descriptions of these codes appear in Field 22. (See Section VIII for special instructions specific to the use and entry of Distribution/Availability Statements and Codes.
34	Serial Code	1	2	A-I	0	This is an abbreviated version of the data in Field 9. For final, summary or annual reports, enter the abbreviations: Final - F Summary - S Annual - A

For other serially-numbered reports, enter only the number:
 Progress Rpt No. 9 - 9
 Interim Rpt No. 10 - 10
 Quarterly Rpt No. 3 - 3

Field Number	Name	Field Lengths (Characters)		Character Type	Requirement Type	Description/Format
		Min.	Max.			
35	Corporate Author Code	6	6	1	03	Enter the 6-digit numeric code which corresponds to the organizational name and address of the corporate author of the report. The authority for valid codes is the DDC Source Header List (DDCH 4185.4).

42	IAC Document No.	4	12	A/N	M	A document number assigned by each IAC to provide a unique identity to each IAC-accessed document. It also constitutes a flag identifying the entire report citation record with the IAC that submitted the data. The IAC document number consists of an IAC-identifying prefix, a dash, and a serial number. The serial portion will consist of 6 digits, zero filled. Examples: MCIC-123456 NI-000345 FL-021999
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43	IAC Document Type/Location Code	1	1	N	0	A single digit code assigned to each IAC to identify type or location of each document as follows:
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Code	Explanation
1	Hard Copy
2	Microfilm
3	Microfilm
4	Journal Articles

Field Number	Name	Field Length (Characters)		Character Type	Requirement Type	Description/Format
		Min.	Max.			
44	IAC Subject Terms	3	600	/N	R	

- Code Explanation
- 5 Official Use Only
 - 6 Proprietary
 - 7 Confidential
 - 8 Secret

Enter a set of IAC-specific subject terms. Up to 600 characters total. Use the comma and a space combination to delimit each separate single or multiword term. If desired, significant terms may be weighted or flagged by an asterisk prefix. (Upper and lower case letters recognized.)

NOTE: Subject terms may not be individually modified or added to the IAC subject term field during the record update process. The entire set of terms must be contained in any input transaction.

1 Character Type : A = Alphabetic characters only, A - Z
N = Numeric digits only, 0 - 9
A or N = Either alphabetic characters or numeric digits only, A - Z and/or 0 - 9, but no special characters
A/N = May contain alpha, numeric and/or allowable special characters

2 Requirement Codes: M = Mandatory, item cannot be processed without a correct entry
R = Required, necessary to a complete or useable record; will produce an error message if absent
O = Optional, may be omitted

3 This field is optional for IAC input but required for normal DDC processing; therefore, its absence will produce an error message.

APPENDIX C

DOCUMENT ANNOUNCEMENT BULLETIN-SAMPLE

PLASTEC 21059

McDonnell Douglas Astronautics Co., Huntington Beach, Calif.

MECHANICS OF FAILURE OF COMPOSITES, by Creszczuk, L.B.
May 74. MDC G5365. Final report 1 Apr 73 - 31 May 74.
121 p. figs. tables, 6 refs. Navy contract
N00019-73-0405.

Experimental and theoretical studies are presented on the influence of composite microstructure on the transverse tensile and shear strength of graphite and glass fiber-reinforced composites predicted from previously formulated failure criteria. Sensitivity of the transverse and shear strength to variations and errors in fiber content, void content, resin content, specific gravity of composite, and properties of the fibers and the matrix is investigated. In conjunction with these studies, an approximate solution is presented for the residual thermal stresses in composites consisting of orthotropic fibers and isotropic matrix, the properties of which are temperature-dependent. Theoretical and experimental studies are also presented on compressive strength and failure modes of unidirectional composites and graphite-epoxy and graphite-phenolic composites. (Author, modified)

Composites-Mechanics; Failure-Composites; Composites-Properties;
Microstructure-Composites; Strength-Composites; Graphite
composites-Properties; Fiberglass composites-Properties; ZZ Unlimited

PLASTEC 21060

NASA Goddard Space Flight Center, Greenbelt, Md.

THE EFFECTS OF PARTICLE SIZE ON THE OPTICAL PROPERTIES
AND SURFACE ROUGHNESS OF A GLASS-BALLOON-FILLED BLACK
PAINT, by Heslin, T. et al. May 74. NASA TN D-7643.
G-7432. 9 p. figs. tables, 5 refs.

The effects of particle size on the optical properties and surface roughness of a glass-balloon-filled, carbon-pigmented paint are studied in order to develop a diffuse-reflecting, low-total-reflectance, low-outgassing black paint. Particle sizes range between less than 20 microns and 74 microns. Surface roughness is found to increase with increasing particle size. Relative total reflectance at near-normal incidence (MgO standard) of the filled paints is less than for the unfilled paint between 230 nm and 1800 nm. Total absolute reflectance at 546 nm decreases with increasing particle size at grazing angles of incidence. Near-normal, total emittance is greater for the filled paints than for the unfilled paint. Specularity decreases with increasing particle size over the range studied. (Author)

Carbon paint-Surface/optical properties; Properties surface/optical-Carbon
paint; Paint/carbon-Surface/optical properties; Particle size
effect-Carbon paint; ZZ Unlimited

APPENDIX D PLASTEC SUBJECT INDEX-SAMPLE

SUBJECT INDEX	PAGE	1974
injection molding.		
20542 Injection molding bulk compounds.		
Injection molding-Carbon/polyamide		
19581 Properties of carbon fiber reinforced polyamides in dependence of the manufacturing process.		
Injection molding-Cavity Fill		
20882 Monitoring and control of systems for cavity fill.		
Injection molding-Computer application		
20884 Computer control of the injection molding process.		
Injection molding-Computer program		
20154 Computer controlled injection molding process.		
Injection molding-Container		
M19697 Performance evaluation of plastic star pack containers -6 inches X 6 inches X 10 inches.		
Injection molding-Control		
20542 Injection molding bulk compounds.		
Injection molding-Conveying & separating		
20883 Parts conveying and separating.		
Injection molding-Cooling		
20892 Thermal considerations for mold cooling design.		
Injection molding-Cost		
19596 Cost comparison of plastic parts for the transportation industry based on different manufacturing processes.		
Injection molding-Cost analysis		
20087 Economics of plastic molding processes.		
Injection molding-Cost saving		
20352 Cost savings in processing silicone molding compounds.		
Injection molding-Coupling agent/FRP/Acetal		
20003 Glass coupled acetal copolymer.		
Injection molding-Crystallization effect		
20754 Structure development in injection molding acetal homopolymer.		
Injection molding-Fiber degradation		
20542 Injection molding bulk compounds.		
Injection molding-Flaw, Acetal copolymer		
20075 Fundamentals of fatigue and creep rupture of a thermoplastic.		
Injection molding-Flow visualization		
20730 Flow visualization of injection molding.		
Injection molding-FRP/polyamide		
19581 Properties of carbon fiber reinforced polyamides in dependence of the manufacturing process.		
Injection molding-FRP/PET		
20587 Glass fiber reinforced PET in Japan.		
Injection molding-Gate design		
20891 Gate design for general purpose and heat-sensitive materials.		
Injection molding-Goggles		
M19021 Production engineering measure for design and manufacture of plastic optics for goggles.		
M19022 Production engineering for design and manufacture of plastic optics for goggles.		
Injection molding-High pressure		
20060 Changes in processing of crosslinking plastics to reduce molding time.		
Injection molding-Infrared sensor		
20541 Detection of transient polymer melt temperatures in the injection molding process.		
Injection molding-Machine		
19596 Cost comparison of plastic parts for the transportation industry based on different manufacturing processes.		
Injection molding-Materials handling		
20542 Injection molding bulk compounds.		
Injection molding-Melt temperature		
20541 Detection of transient polymer melt temperatures in the injection molding process.		
20721 Effects of melt processing variables on the morphology and properties of injection molded polypropylene.		
Injection molding-Nica/Nylon 66		
19986 Nica reinforced plastics.		
Injection molding-Nica/ABS		
19986 Nica reinforced plastics.		
Injection molding-Nica/PA6		
19988 Nica reinforced plastics.		
Injection molding-Mineral filler/nylon		
19995 Silane coupling agents for reinforcement of mineral filled nylons.		
Injection molding-Mold design		
20156 Controlling injection molding parameters for optimum surface gloss and strength at the weld line.		
Injection molding-Mold filling		
20731 Simulation of the mold filling process.		
Injection molding-Nitrile polymer		
20139 Properties, processing, and applications of a new nitrile polymer.		
Injection molding-Nylon 66		
20731 Simulation of the mold filling process.		
Injection molding-Optimization		
M19021 Production engineering measure for design and manufacture of plastic optics for goggles.		
20158 Holding area diagrams as an approach to optimizing thermostat injection molding.		

INHOMOGENEOUS SUPERCONDUCTORS	INJECTION UTILITY	INJURY PROBABILITY
USE HETEROGENEITY and SUPERCONDUCTORS	USE INJECTION	USE PROBABILITY and WOUNDS AND INJURIES
INITIAL VALUE PROBLEMS	INJECTIONS(MEDICINE)	INJURY RATE
USE BOUNDARY VALUE PROBLEMS	NT INTRAMUSCULAR INJECTIONS	USE WOUNDS AND INJURIES
INITIATING ARMING	BT INJECTION	INJURY REPAIR PROCESSES
USE ARMING DEVICES	INJECTION(MEDICINE)	USE TREATMENT and WOUNDS AND INJURIES
INITIATING ENGINEERING	USE INJECTIONS(MEDICINE)	INJURY STUDIES
USE ENGINEERING	INJECTOR BAFFLES	USE WOUNDS AND INJURIES
INITIATOR POWER SUPPLY	USE BAFFLES and INJECTORS	INJURY TREATMENT
USE EXPLOSIVES INITIATORS and POWER SUPPLIES	INJECTOR CONFIGURATIONS	USE TREATMENT and WOUNDS AND INJURIES
INITIATORS(EXPLOSIVES)	USE INJECTORS and SHAPE	INK
USE EXPLOSIVES INITIATORS	INJECTOR GEOMETRY	USE INKS
INJECTION	USE GEOMETRY and INJECTORS	INK FORMULAS
NT FUEL INJECTION	INJECTOR PUMP	USE INKS
*INJECTIONS(MEDICINE)	USE INJECTORS and PUMPS	INKS
SECONDARY INJECTION	INJECTOR SPRING STIFFNESS	INLAND
WATER INJECTION	USE INJECTORS and SPRINGS and STIFFNESS	NT *INLAND WATERWAYS
INJECTION DEVICES	INJECTOR SYSTEM	BT GEOGRAPHIC AREAS
USE INJECTIONS(MEDICINE) and MEDICAL EQUIPMENT	USE INJECTORS	INLAND BRACKISH WATER
INJECTION DIODES	INJECTOR VARIABLES	USE BRACKISH WATER and INLAND WATERWAYS
BT *SEMICONDUCTOR DIODES	USE INJECTORS and VARIATIONS	INLAND LOGISTICS SYSTEMS
INJECTION EQUIPMENT	INJECTORS	USE INLAND and LOGISTICS
USE INJECTION	NT FUEL INJECTORS	INLAND TRANSFER POINTS
INJECTION GUIDANCE	BT PUMPS	USE INLAND and TRANSFER
BT GUIDANCE	INJECTOR-DRIVEN CLOSED CIRCUIT	INLAND WATER
INJECTION LASER PACKAGING	TUNNEL	USE INLAND WATERWAYS
USE INJECTION LASERS and PACKAGING	USE INJECTORS and TUNNELS(ELECTRONICS)	INLAND WATER CROSSING
INJECTION LASER TRANSMITTERS	INJURED MILITARY PERSONNEL	USE INLAND WATERWAYS
USE INJECTION LASERS and TRANSMITTERS	USE MILITARY PERSONNEL and WOUNDS AND INJURIES	INLAND WATER QUALITY
INJECTION LASERS	INJURED SOLDIER	USE INLAND WATERWAYS and QUALITY
BT *LASERS	USE SOLDIERS and WOUNDS AND INJURIES	INLAND WATERWAYS
INJECTION LEVEL	INJURED SOLDIERS	NT CANALS
USE INJECTION	USE SOLDIERS and WOUNDS AND INJURIES	*LAKES
INJECTION LUMINESCENCE	INJURED SURVIVORS	PONDS
USE INJECTION and LUMINESCENCE	USE SURVIVAL(PERSONNEL) and WOUNDS AND INJURIES	*RIVERS
INJECTION MOLD	INJURED SWIMMER	BT *INLAND *WATERWAYS
USE INJECTION and MOLDS(FORMS)	USE SWIMMERS and WOUNDS AND INJURIES	INLET AIR PRESSURE
INJECTION MOLDING	INJURED SWIMMERS	USE AIR and INLETS and PRESSURE
USE INJECTION and MOLDING TECHNIQUES	USE SWIMMERS and WOUNDS AND INJURIES	INLET AIR TEMPERATURE
INJECTION MOLDING COMPOSITIONS	INJURED TROOPS	USE AIR and INLETS and TEMPERATURE
USE INJECTION and MOLDINGS	USE MILITARY PERSONNEL and WOUNDS AND INJURIES	INLET AIR TEMPERATURES
INJECTION MOLDING DIES	INJURY	USE AIR and INLETS and TEMPERATURE
USE DIES and INJECTION and MOLDINGS	USE WOUNDS AND INJURIES	INLET AIRFRAME INTERACTIONS
INJECTION MOLDING TECHNIQUES	INJURY DATA	USE AIRFRAMES and INLETS and INTERACTIONS
USE INJECTION and MOLDING TECHNIQUES	USE WOUNDS AND INJURIES	INLET AREA
INJECTION PROCESSES	INJURY MECHANISM	USE INLETS
USE INJECTION	USE WOUNDS AND INJURIES	INLET CONFIGURATIONS
INJECTION SITES	INJURY MECHANISMS	USE INLETS
USE INJECTION and SITES	USE WOUNDS AND INJURIES	INLET CONTROL
INJECTION SLOT	INJURY MODE	USE CONTROL and INLETS
USE INJECTION	USE WOUNDS AND INJURIES	INLET DISTORTION
and SLOTS	INJURY PREDICTION MODELS	USE DISTORTION and INLETS
INJECTION SYSTEM	INJURY PREDICTIONS	INLET DUCT
USE INJECTION	USE PREDICTIONS and WOUNDS AND INJURIES	USE DUCTS
INJECTION TESTING		
USE INJECTION and TEST METHODS		

Infusorial earth
 USE Diatomaceous earth
Ingestion (biology) 0616
 UF Drinking
 Fasting
 RT Digestion (biology)
Ingestion (engines) 2111
 RT—intake systems
Ingot molds 1106
 BT Castings
 Metal products
Ingots 1106
 BT Castings
 Metal products
 Metal shapes
NT Extrusion ingots
Foundry ingots
Rolling ingots
T ingots
RT—Billets
 Blooming mills
 Blooms (metals)
 Cakes
 —Casting
 —Cast products (for remelting)
 —Cast products (for reworking)
 Columnar structure
 Equiaxed structure
 Hot topping
 —Molds
 —Pouring
 Soaking
 Soaking pits
 Solidification
 Steel castings
 Titanium castings
 Wire bar
Ingrain dyes 1103
 BT Dyes
Ingredients 1107
 RT Blends
 Components
 Compositions
 Equivalent weight
 Formulations
 Mixtures
 Raw materials
Inguinal hernias 0605
 BT Hernias
Inhalation
 USE Respiration
Inhibition 1407
 RT Arresting (process)
 Catalysis
 —Coating processes
 Constraining
 —Corrosion prevention
 —Damping
 Extinguishing
 —Inhibitors
 Neutralizing
 Passivity
 Retarding
 —Stabilization
 Stopping
Inhibition (psychology) 0510
 RT—Conditioning (learning)
Inhibitors 1107
 UF †Growth inhibitors
 NT Antifogging agents
 Corrosion inhibitors
RT Attenuators
 —Catalysts
 —Coatings
 —Corrosion prevention
 —Inhibition
 Neutralizers
 —Retardants
 Suppressors
Inhomogeneity
 USE Heterogeneity
Inhomogeneous plasmas 2009
 BT Plasmas (physics)
 RT Seeded plasmas
Initial provisions 1505
 RT Allowance
 —Maintenance
 Supplying
Initial stress 2012
 BT Stresses
 RT Stress relaxation
Initial tangent modulus 2012
 BT Mechanical properties
 RT Modulus
 —Elastic properties

—Modulus of elasticity
 Secant modulus
 —Shear properties
 Tangent modulus
 —Tensile properties
Initial value problems
 USE Boundary value problems
Initiativ : 1407
RT Activation
 Actuation
 Detonation
 Inoculation
 Nucleation
 Starting
 Stimulation
Initiators (explosives) 1901
 UF Electroexplosive devices
BT Igniters
NT—Boosters (explosives)
 Caps (explosives)
 Depth charge boosters
 —Detonators
 Electric detonators
 Electric primers
 Mine boosters
 —Primers (explosives)
 Torpedo boosters
RT Explosive trains
 —Fuzes (ordnance)
 —Pyrotechnics
 —Rocket engine components
 —Torpedo components
Injection 1407
 UF Injection rates
 Injectivity index
 Slugging
 †Steam injection
NT Gas injection
 Secondary injection
 Water injection
RT Charging
 Filling
 Injections (medicine)
 —Injectors
 Input
 Stimulation
 Supplying
Injection grouting
 USE Grouting
Injection guidance 1707
RT All inertial guidance
 Ascent trajectories
 Celestial guidance
 —Command guidance
 —Inertial guidance
 Midcourse guidance
 Preset guidance
 Rendezvous guidance
 Spacecraft guidance
Injection lasers 2005
BT Lasers
 Stimulated emission devices
RT Gallium arsenide lasers
 —Semiconductor lasers
Injection molding 1308
BT Molding techniques
RT Blow molding
Injection patterns 0809
RT Gas injection
 Injection wells
 Oil recovery
 Patterns
 Production rate
 Reservoir engineering
 Stimulation
 Water injection
Injection rates
 USE Injection
Injections (medicine) 0605
RT Blood transfusion
 —Dosage forms
 —Injection
 Parenteral infusions
Injection wells 0809
BT Wells
RT Gas injection
 Injection patterns
 Producing wells
 Recharge wells
 Stimulation
 Water injection
Injectivity index
 USE Injection
Injectors 1407
 UF Economizer jets
 Jetting
 Main jets

NT Fuel injectors
 Rocket propellant injectors
RT Blowlinks
 Carburetors
 —Ejectors
 Feeders
 —Injection
 Jet flow
 Jet mixing flow
 Nozzle flow
 —Nozzles
 Pneumatic conveyors
 —Pumps
 Screw conveyors
Injuries 0605 0621
NT—Animal bites
 Battle injuries
 Birth injuries
 —Bites and stings
 Bone fractures
 Brain damage
 —Burns (injuries)
 Chemical burns
 Choroidretinal burns
 —Cold injuries
 Electrical burns
 Electrical shock
 —Eye injuries
 Flash burns
 Frostbite
 Gunshot wounds
 Immersion foot
 Insect bites
 Insect stings
 Joint dislocations
 Lenticular burns
 —Radiation burns
 —Radiation injuries
 Radiodermatitis
 Snakebites
 Sprains and strains
 Thermal burns
 Ultrasonic injuries
 Vexications
 —Wounds
RT—Accidents
 Atelectasis
 —Carotrauma
 Concussion
 —Damage
 Foreign bodies
 —Hazards
 —Hemorrhage
 Hemorrhagic shock
 Hemothorax
 —Pathology
 —Therapy
 Toxicology
Inks 1405 1103
NT Printing inks
RT Colors (materials)
 Writing
Inland waterways 1505
BT Waterways (transportation)
NT Navigable canals
RT Harbors
 Lakes
 Mannas
 Rivers
 Waterway transportation
Inlet guide vanes 0103 2110
BT Control surfaces
 Vanes
RT—Engine inlets
 —Fins
Inlets (devices)
 USE Intake systems
Inlets (waterways) 0806
BT Coastal topographic features
 Topographic features
 Waterways (watercourses)
RT Fjords
 Harbors
 Jetties
 Lagoons (landforms)
 —Landforms
Inner ear
 USE Labyrinth (anatomy)
Inoculation 1407
 UF Seeding (inoculation)
RT—Antibodies
 —Crystal growth
 Crystallization
 —Graphitizing
 Immunity
 Initiation
 Nucleation

Primary graphitizing
 —Therapy
 Vaccines
Inorganic acids 0702
UF Mineral acids
NT Boric acids
 Chlorosulfonic acid
 Chlorosulfurous acid
 Chromic acid
 Fluoroboric acid
 Hydrazoic acid
 Hydrochloric acid
 Hydrobromic acid
 Hydrochloric acid
 Hydrofluoric acid
 Iodic acid
 Nitrous acid
 Perchloric acid
 Phosphoric acids
 Phosphorous acids
 —Phosphorus inorganic acids
 Sulfuric acid
 Sulfurous acid
 Terephthalic acids
RT—Hydrogen inorganic compounds
Inorganic azides 0702
UF Azides (inorganic)
BT Nitrogen inorganic compounds
NT Lead azides
 Sodium azides
Inorganic chemistry 0702
RT—Chemical reactions
Inorganic compounds 0702
 Use of a more specific term is recommended, consult the terms listed below
 Alkali metal compounds
 Alkaline earth compounds
 Complex compounds
 Group 1B compounds
 Group 2B compounds
 Group 3A compounds
 Group 3B compounds
 Group 4A compounds
 Group 4B compounds
 Group 5A compounds
 Group 5B compounds
 Group 6A compounds
 Group 6B compounds
 Group 7B compounds
 Group 8 compounds
 Inorganic acids
 Inorganic chemistry
 Intermetallics
 Rare gas compounds
Inorganic disulfides 0702
BT Inorganic polysulfides
 Inorganic sulfides
NT Molybdenum disulfide
Inorganic manmade fibers 1105
BT Fibers
 Manmade fibers
NT Carbon fibers
 Ceramic fibers
 —Glass fibers
 Glass wool
 —Metal fibers
 Metal whiskers
 —Mineral wool
 Rock wool
 —Whiskers (single crystals)
Inorganic nitrates 0702
BT Nitrogen inorganic compounds
NT Ammonium nitrate
 Cesium nitrate
 Iron nitrates
 Lead nitrates
 Potassium nitrate
 Silver nitrate
 Sodium nitrates
 Yttrium nitrates
RT Nitrate deposits
 —Nitrates
 Nitrites
 —Organic nitrates
Inorganic peroxides 0702
BT Oxides
NT Hydrogen peroxide
RT—Curing agents
 —Peroxidic organic compounds
 Sulfur
 Vulcanizing agents
Inorganic phosphates 0702
BT Pyrophosphates
UF Phosphorus inorganic compounds
NT Aluminum phosphate
 Calcium phosphates