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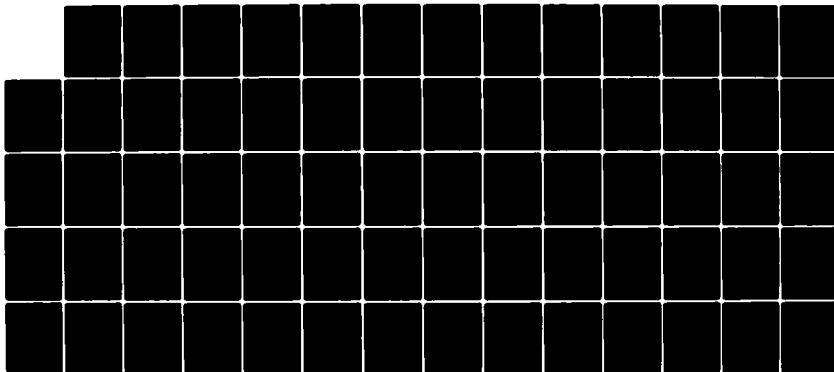
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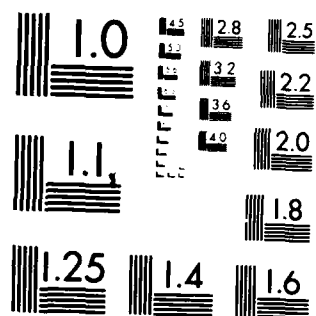
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ANNUAL REPORT
METALS AND CERAMICS INFORMATION CENTER

July 1983

HAROLD MINDLIN, MANAGER
BATTELLE-COLUMBUS
Columbus, Ohio

FILED

JUL 29 1983

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ANNUAL REPORT (MAY 1982-APRIL 1983)—CONTRACT DLA900-78-C-1715

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Prepared for

ARMY MATERIALS AND MECHANICS RESEARCH CENTER
Watertown, Massachusetts 02172

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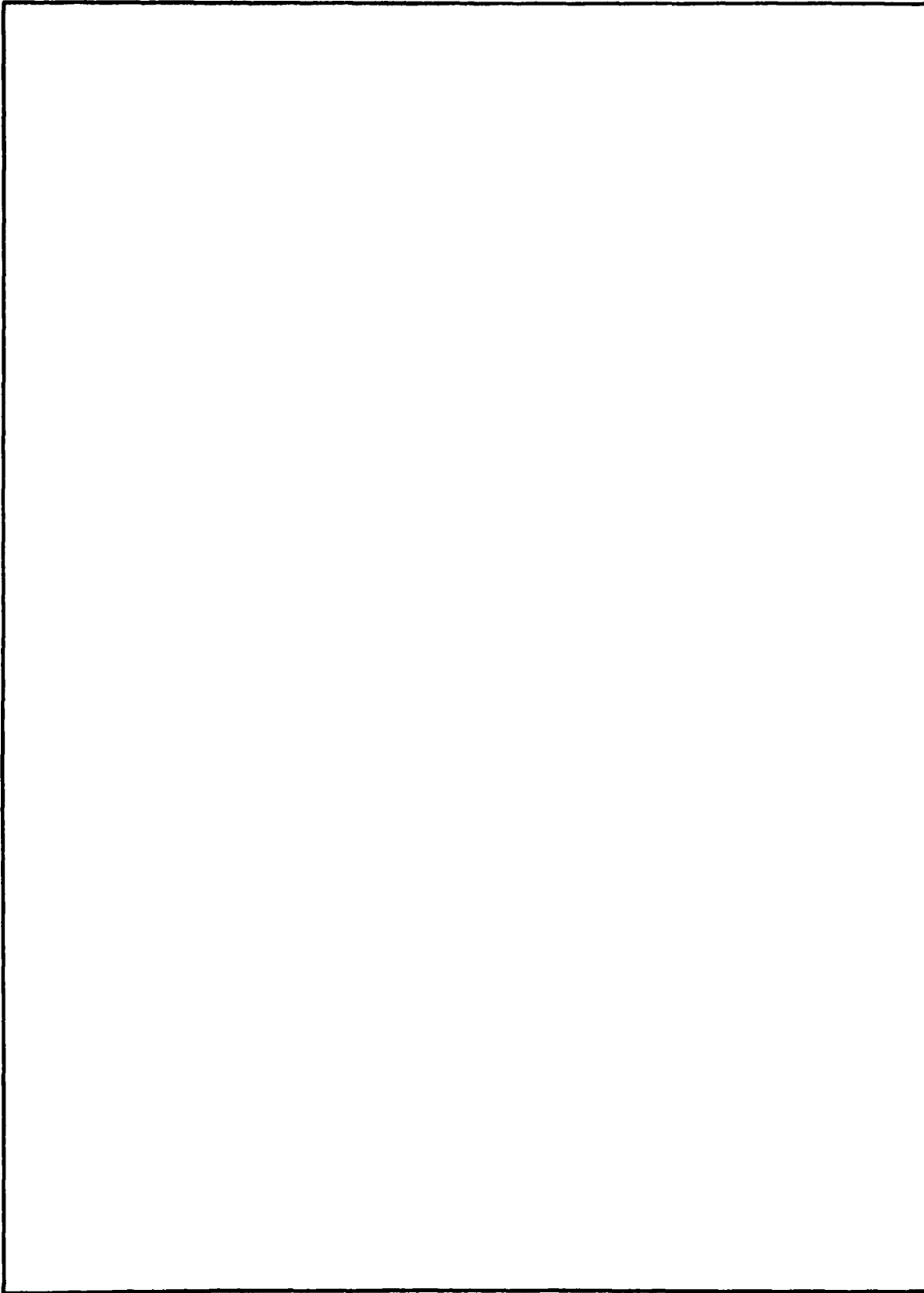
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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report reviews the continuing operations of the Metals and Ceramics Information Center for the Twentieth Quarter and the annual period of May 1, 1982 through April 30, 1983. Activities and coverage of the Center are discussed in terms of the major work areas: Information, Operations, Products and Services, Service-Charge Program, Marketing, and Management. Future plans for the Center also are included.		

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SUMMARY

The Metals and Ceramics Information Center (MCIC) is one of the technical Information Analysis Centers (IACs) chartered and sponsored by the Department of Defense (DoD). The objective of the Center is to increase the productivity of scientists, engineers, and technicians engaged in scientific and engineering programs for the DoD. The Center is responsible for the collection, review, analysis, appraisal, and summary of the available scientific and technical information and data on selected metals and ceramics. The resources and capabilities of MCIC, a full-service IAC, are also available to the technical community at large through an extensive program of products and services.

This fifth and final Annual Report on Contract No. DLA900-78-C-1715 covers the program activities for the period 1 May 1982 through 30 April 1983. Operating statistics and contract status reports are provided for the Twentieth Quarter and the complete reporting period. During this 12-month contract period, the Center continued to meet its contractual goal for recovery of products and service costs. Actual direct annual income from the sale of products and services was \$253,485; income from special tasks and related activities was \$282,007. This total income of \$535,492 resulted in a cost recovery of 74.1 percent relative to the direct funding of \$722,320 for this period. A substantial portion of MCIC's income continues to come from the special studies and tasks undertaken for Department of Defense components. Nine studies/tasks were conducted in this report period.

In addition to the information acquisition and processing efforts, technical publications and inquiry services remain the major activities in MCIC's basic program. The publications completed, reprinted, or in process consist of:

- 11 Current Awareness Bulletins (CAB)
- 4 technical reports
- Quarterly Supplements to Aerospace Structural Metals Handbook
- Semiannual Supplements to Structural Alloys Handbook

The Center continued to give high priority to responses for technical assistance (of these incoming requests, 410 were processed and 23 were cancelled). Of the assigned requests, 98 were subject to user charge and 312 were answered free of charge.

Utilizing the RDT&E On-Line System at the Defense Technical Information Center, the information base added 3,069 technical documents to the MCIC information system. Included in the annual total are 731 documents accessed in the Twentieth Quarter.

Future plans are for the cost-effective continuation of the primary and established products and services of the Center necessary to attain MCIC's goals and objectives.

PREFACE

This report was prepared by the Metals and Ceramics Information Center (MCIC) which is operated by Battelle's Columbus Laboratories, 505 King Avenue, Columbus, Ohio 43201, under Contract DLA900-78-C-1715. The MCIC program has been administered under the direction of the Defense Technical Information Center, Defense Logistics Agency, with technical supervision by the Army Materials and Mechanics Research Center, Watertown, Massachusetts. Mr. David W. Seitz is the Contracting Officer's Technical Representative.

This annual report covers the period of work May 1, 1982, through April 30, 1983. The Twentieth Quarter statistics (February 1983 through April 1983) are also included. The report was released by the author July 1983.

MCIC and Battelle management express their appreciation to those many sponsor representatives whose advice, guidance, and support have been essential to the continuing success of the MCIC program. Particular mention should be made of the significant contributions of

Mr. Hubert E. Sauter, DTIC

Ms. Sara Williams, DESC

Mr. James Pendergast, DTIC

Ms. Karen Colwell, DESC

Mr. Brian McCabe, DTIC

Mr. Jerome Persh, OUSDRE

Mr. Raymond Farrow, AMMRC

Mr. David W. Seitz, AMMRC

A handwritten form with a large "A" and various markings, including a checkmark and some illegible text.

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**ANNUAL REPORT
(May, 1982 through April, 1983)**

and

**Twentieth Quarterly Progress Report
(February through April, 1983)**

on the

**OPERATION OF THE METALS AND CERAMICS
INFORMATION CENTER**

to

**ARMY MATERIALS AND MECHANICS
RESEARCH CENTER**

INTRODUCTION

In 1971, the Metals and Ceramics Information Center (MCIC) was formed through the merger of the Defense Metals Information Center (DMIC) and the Defense Ceramic Information Center (DCIC). The former had been operated by Battelle since the mid-1950s, and the latter since 1967. With the close of the Mechanical Properties Data Center (MPDC) in April 1982, MCIC assumed the responsibility for the continued publication of two technically accepted MPDC Handbooks--Aerospace Structural Metals Handbook and the Structural Alloys Handbook.

As one of the family of technical information analysis centers sponsored by the Department of Defense, MCIC's purpose is to provide an authoritative source of current engineering and scientific information and data on metal and ceramic materials which may be applicable to defense systems. Although intended primarily for service to agencies of DoD and their contractors, MCIC's resources are available to the technical community at large, thus contributing to the transfer and adaptation of defense-developed materials technology for commercial and consumer use.

This report summarizes MCIC activities for the period May 1, 1982, through April 30, 1983, the fifth and last 12-month period under Contract DLA900-78-C-1715. It provides a summary of the scope, objectives, and organization of MCIC, its information processing and services, and a discussion of future plans for the maintenance of the Center's resource of technical knowledge in metals and ceramics. Statistical summaries of expenditures for the various activities conducted in the Twentieth Quarter, the fifth year, and the total five-year contract period are given in Appendix A (DSAH Form 1261).

Scope and Purposes of MCIC

MCIC is recognized as a formal full-service Department of Defense Information Analysis Center (IAC). As such, under the contract reported on herein, its objectives have been to provide scientific and technical information analysis services to the Department of Defense components, contractors and grantees, U.S. Government agencies and their contractors, and to the private sector. The scope includes metals and ceramics in various forms (i.e., bulk, coating, etc.) that are utilized in defense systems and hardware with emphasis on critical structural applications and/or stringent environments.

The Center collects and provides its users with information on the design characteristics, applications, processing, fabrication, quality control, environmental effects, test methods, sources, suppliers, and specifications for materials within its scope.

To accomplish these objectives, the MCIC program consists of five principal functions:

- (1) Maintain a comprehensive, up-to-date, authoritative technical information base.
- (2) Respond to requests for technical advice and assistance from Government agencies, contractors, suppliers, and the public sector.
- (3) Issue the monthly Current Awareness Bulletin covering metals and ceramic technology on a variety of subjects.
- (4) Publish technical reports, handbooks, databooks, critical reviews, and technology assessments appraising the state of the art of metals, ceramics, and related processes.
- (5) Conduct a variety of special studies for DoD agencies and other departments of the Federal government.

Organization of the MCIC Program

The Metals and Ceramics Information Center is assigned to the Materials Information Program Office of Battelle's Columbus Laboratories. The Manager of that office also serves as Director of MCIC. Members of the permanent MCIC staff are drawn from Battelle's Materials Department and Computer, Information Systems, and Education Department. That full-time staff averages 11 engineers, information specialists, and secretarial assistants, who are supported by engineers and scientists from throughout the Columbus Laboratories (see Figure 1), contributing on a part-time basis as needed. The fundamental strength of the MCIC program lies in this team of qualified authorities, whose experience and daily participation in advanced materials research provides the Center's users with expert technical advice and authoritative state-of-the-art publications.

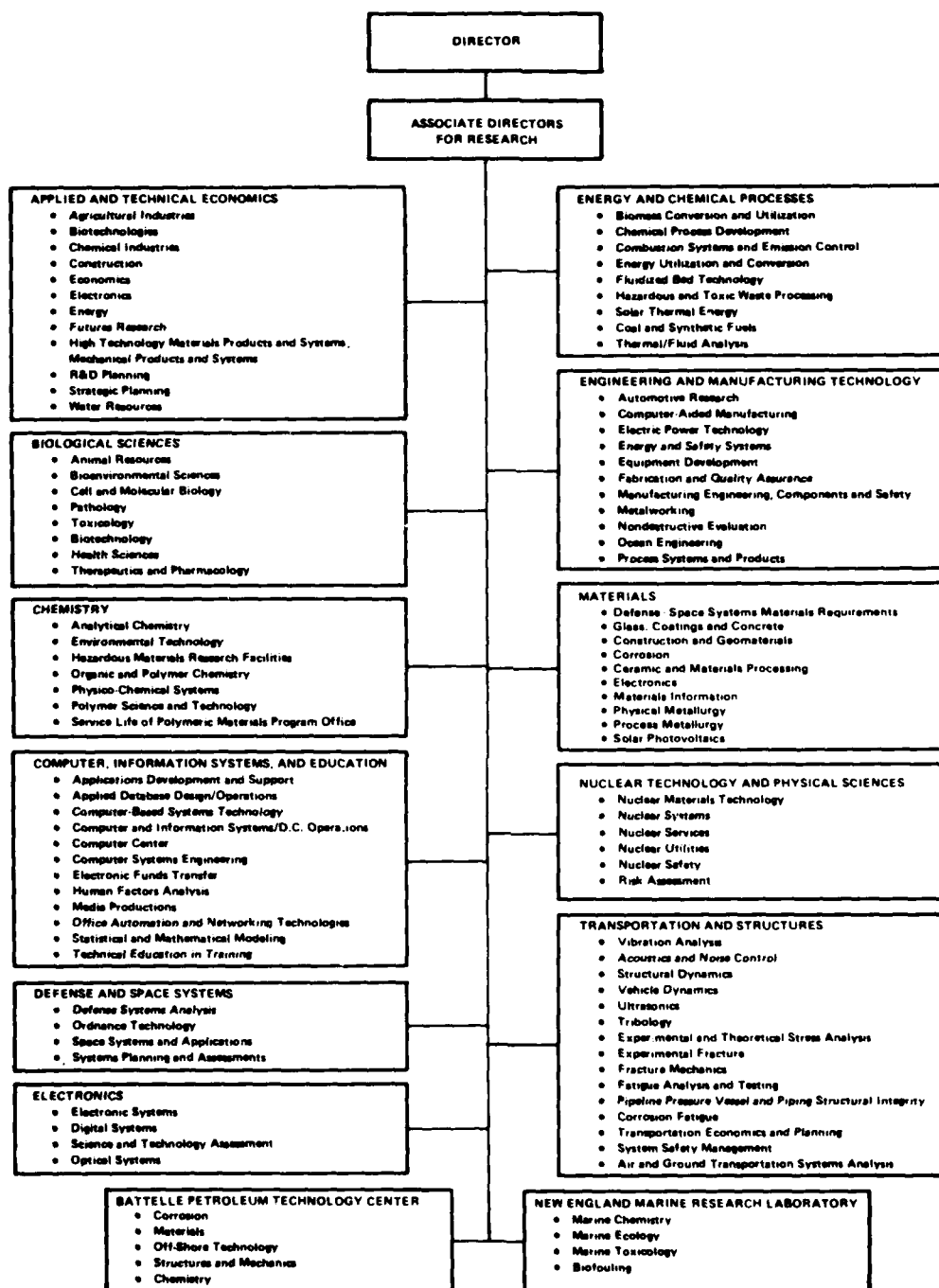


FIGURE 1. BATTELLE-COLUMBUS RESEARCH DEPARTMENTS

Key MCIC staff assigned to manage the basic functions of the Center are:

Program Manager and Coordinator of Special Studies	Harold Mindlin
Technical Inquiries and Current Awareness Bulletin	Frank J. Jelinek
Coordination of Marketing, Promotion, and Publications	Harold J. Hucek
Information Operations	Helen Pestel

INFORMATION OPERATIONS

An information base is maintained by MCIC to provide technical documentation needed by staff scientists and engineers who compile the various products of the Center and to provide a rapid, inexpensive retrieval mechanism to support the Center's technical inquiry service and special studies. The information base contains over 130,000 documents collected and reviewed since 1955 under MCIC and its two predecessors, DMIC (Defense Metals Information Center) and DCIC (Defense Ceramic Information Center).

The MCIC information base is maintained in two separate retrieval systems. The items collected prior to 1971 are maintained in a manual system utilizing extracts of documents which are filed in multiple locations by key words (index terms). The MCIC computerized file was initiated in 1971 utilizing the Battelle BASIS Database Management System. In March 1975, the computerized database was moved to the Defense Technical Information Center's Defense RDT&E On-Line System (DROLS). As of April 22, 1983 (Tab cycle 83-10), the computerized file contains 46,561 references of which 31,414 are unique to the MCIC program, and 15,147 are DTIC holdings that were modified by enriched indexing.

Acquisition of Information

During the fifth year of the current MCIC contract, 3528 documents were acquired and reviewed for input into the MCIC database. Of these, 459 documents were rejected because they were not considered relevant to the MCIC scope or because they duplicated information presently in the information base. During the Twentieth Quarter, 814 documents were reviewed and 731 documents were accessioned. Accessioning during the fifth year of the contract continued at the same rate established during the Fifteenth Quarter--reflecting the reduction of direct funding for FY 82 and FY 83. The reduced accessioning rate has been accomplished by removing all composite materials except carbon/carbon from the scope, by being more selective in the documents and technical topics added to the collection, and by having a backlog of documents waiting for review for inclusion to the database.

The type and number of documents accessioned by MCIC for the database in the Twentieth Quarter and for the year are shown in Table 1. Included are journal articles, government reports, conference papers, and miscellaneous sources such as books, trade literature, and internal papers.

Documents related to metals and metallurgy represent 92.0 percent of the annual input (95.8 percent for the Twentieth Quarter), ceramics represent 4.6 percent of the annual input (3.1 percent for the Twentieth Quarter), and composites represent 3.4 percent of the annual input (1.1 percent for the Twentieth Quarter). The composites documents were acquired to support the Carbon/Carbon Data Bank, a special project for MCIC.

Identification and acquisition of pertinent technical literature are aggressively pursued by the MCIC staff. The primary source of reports generated by DoD and other Government agencies is the contractors or agencies producing the reports. Receiving reports on direct distribution avoids time delays in receipt of this information from secondary sources and allows the Center to have access to interim progress reports not distributed to secondary sources.

Pertinent reports not received on direct distribution are identified and ordered from Government abstracting services including DTIC's Technical Abstracts Bulletin (TAB), NTIS's Government Report Abstracts (GRA), NASA's Scientific and Technical Aerospace Reports (STAR), and DoE's Energy Research Abstracts (ERA).

Journal articles and technical papers are selected by screening materials entering the Battelle Library on a daily basis. This source is supplemented by subscribing to key journals and ordering of individual technical papers by MCIC.

One to two percent of the Center's acquisitions are from sources such as books, trade literature, and trip reports and memoranda on MCIC staff activities which contain technical data.

TABLE 1. MCIC ACQUISITIONS, MAY 1982-APRIL 1983

Document Type	Quarterly Period				Annual Total	Percent 20th Quarter	Percent Annual
	May-Jun 82	Jul-Oct 82	Nov 82-Jan 83	Feb-Apr 83*			
Journal Articles	438	423	374	493	1728	67.4	56.3
Technical Reports	(234)	(320)	(269)	(162)	(985)	(22.2)	(32.1)
Air Force	69	96	61	39	265	5.3	8.6
Army	22	31	31	28	112	3.8	3.6
Navy	74	78	34	43	229	5.9	7.5
Other DoD	12	23	6	8	49	1.1	1.6
NASA	21	41	37	23	122	3.2	4.0
DOE/ERDA	24	26	48	9	107	1.2	3.5
Other	12	25	52	12	101	1.7	3.3
Technical Papers	100	47	101	69	317	9.4	10.3
Miscellaneous	12	6	14	7	39	1.0	1.3
Total	784	796	758	731	3069	100.0	100.0

*Twentieth Quarter.

RDTE Input

A total of 2491 of the 3069 documents accessioned this contract year were processed into MCIC's dedicated database at DTIC (DROLS). The remaining 578 documents were already in the DTIC collection. The DTIC records for these reports were supplemented with the MCIC accession number and enriched indexing. Twentieth Quarter statistics for DROLS input are: 621 items added to the MCIC series, 110 DTIC records augmented with MCIC numbers and enriched indexing.

On-Line Usage of the MCIC Database

On January 16, 1980, the MCIC database became available to all sites having dedicated on-line terminals to the DROLS. In mid-October, 1980, the database became available to dial-up subscribers of DROLS. Surprisingly few problems regarding the use of our database have been brought to the attention of the MCIC staff since the addition of both user groups. MCIC database input staff have attended both the Regional and Annual DROLS Users meetings to be available to assist users of the MCIC and other IAC databases.

Table 2 summarizes the use of the database by type of organization for all records displayed or ordered from the dedicated or dial-up sites for the Seventeenth through Twentieth Quarters. The numbers of users and records retrieved from the MCIC database continue to grow due to the addition of new dial-up users to the DROLS system. For the fifth year of the contract 24,883 records from the MCIC database were used by DROLS users other than the MCIC site. Of these, 7,283 were retrieved in the Twentieth Quarter.

TECHNICAL REPORTS AND HANDBOOKS

Information transfer on advances in materials technology within MCIC's scope and related to applications in defense systems and hardware is an important activity of this program. In response to needs of Government, particularly DoD, as well as industrial and academic communities, a variety of publications is prepared by the Center. The archival documents include handbooks/databooks and technical reports which are represented in state-of-the-art reports, proceedings of conferences, and critical reviews or technology assessments, as well as comprehensive listings of available literature as related to identifiable areas of interest.

Since January 1, 1982, MCIC has assumed the maintenance and publication of the Structural Alloys Handbook (SAH - two volumes) and the Aerospace Structural Metals Handbook (ASMH - five volumes). The upkeep of these handbooks includes the periodic compilation, publication, and distribution of new or revised sections of the Handbooks. Currently, sections of the SAH are issued twice per year; the new or revised chapters of the ASMH are issued quarterly. These handbooks now fulfill MCIC's contractual obligation to publish one handbook/databook per year. All other handbook/databook activity has been discontinued because of funding limitations.

TABLE 2. QUARTERLY STATISTICS ON THE USE OF THE MCIC DATABASE VIA DROLS FOR THE FIFTH CONTRACT YEAR(a)

Class of Users	Seventeenth Quarter			Eighteenth Quarter			Nineteenth Quarter			Twentieth Quarter			20th Quarter Totals		
	Jan. 1-31(b)			Feb. 1-28			Mar. 1-31			Apr. 1-30			Avg. No. Records Retrieved of Sites		
	Avg. No. of Sites	Records Retrieved	No. of Sites	Avg. No. of Sites	Records Retrieved	No. of Sites	Avg. No. of Sites	Records Retrieved	No. of Sites	Avg. No. of Sites	Records Retrieved	No. of Sites	Avg. No. of Sites	Records Retrieved	No. of Sites
Air Force	11.0	437	590	12	184	11.7	482	14	267	15	166	12	58	13.7	491
Army	26.7	809	755	24	209	23.0	604	26	232	28	439	28	300	27.3	971
Navy	16.7	865	402	11	46	11.3	327	13	115	12	249	15	147	13.3	511
Other Government	7.7	138	181	7	42	7.0	145	6	70	7	37	12	224	8.3	331
Industrial	49.0	2,850	2,597	48	772	40.0	2,641	55	878	60	969	69	974	61.3	2,821
Academic(c)				7	57	5.3	110	5	37	2	30	7	65	4.7	132
DTIC	6.3	1,852	1,298	7	550	6.7	1,493	8	284	8	761	9	584	8.3	1,629
Other IACS	3.3	318	209	3	63	3.7	128	4	143	4	157	3	97	3.7	397
Total Other	120.7	6,869	6,032	119	1,923	108.7	5,930	131	2,026	136	2,808	155	2,449	140.6	7,263
MCIC	1.0	3,850	2,472	1	777	1	2,336	1	1,674	1	1,128	1	716	1	3,518
Total	121.7	10,519	8,504	120	2,700	109.7	8,266	132	3,700	137	3,936	156	3,165	141.6	10,801

(a) As measured by the records displayed by users with both on-line displays and orders.

(b) January statistics not available from DTIC in time for Nineteenth Quarterly Report. Quarterly statistics for Nov., Dec., and Jan.

(c) New breakdown as of the Nineteenth Quarter.

A status summary of the Center's publications activity during the past year (May 1982-April 1983) is given in Tables 3 and 4. In this annual period six handbook supplements were published (Table 3). Also, one state-of-the-art report was published in the Twentieth Quarter, and another was completed except for COTR review and printing. Processing on two additional SOARs is continuing.

Funding restrictions and other actions have had an impact on publications in a number of areas over the past few years. These actions or expected reactions are described in more detail below.

1. Because of funding restrictions all MCIC-generated handbooks have been discontinued, e.g., The International Alloy Series (HB-09V1-Titanium, HB-09V2-Superalloys, HB-09V3-Aluminum); The Engineering Properties of Selected Ceramic Series (HB-07V1-Nitrides, HB-07V2-Carbides, HB-07V3-Single Oxides); The Soviet Alloy Handbook; and The Titanium Alloy Handbook. Also discontinued has been publication of conference proceedings of interest to the DoD materials community. In the past, MCIC has made available the proceedings of conferences such as the "Tri-Service Conference on Corrosion".
2. The prices on all MCIC publications have been increased several times in the recent past to compensate for the decrease in the number of publications available for sale, such as proceedings of conferences and MCIC-generated handbooks. The increase in prices has resulted in maintaining our income in spite of the fact that fewer documents are available for sale.
3. The last two MCIC reports have been placed on special export restrictions, which eliminates all foreign and NTIS sales of these reports. If such restrictions continue on MCIC publications, it is anticipated that the annual sales of documents can decrease as much as 37 percent and sales income can decrease by as much as \$33,000. (This calculation of the loss in foreign and NTIS sales and income is based on MCIC sales for the past two years.)

In summary, the funding restrictions and other actions have had and will continue to have an impact on MCIC document sales and income.

A listing of the Battelle personnel who were contributors to the MCIC publications is given in Appendix B.

User Feedback

A continuing effort to determine user satisfaction with MCIC's publications has been in effect since September, 1977, in accordance with contract requirements. The MCIC user evaluation form, shown in previous annual reports, is a modified and approved version of the DLA-suggested form. It is included in technical reports and handbooks purchased for MCIC and includes a business return address to MCIC. All original forms received by MCIC are copied and forwarded to DLA. Although this is a reversal of procedure suggested by DLA, it provides MCIC with a more rapid insight of user responses.

During this annual period, 25 evaluation forms for 12 handbooks, 11 reports, and the CAB and ManTech Journal were received. The returns represent about 1.3 percent of the number of documents sold directly by MCIC. All returns indicated satisfaction with MCIC publications.

TABLE 3. STATUS OF SUPPLEMENTS TO MCIC HANDBOOKS

Alloy or Chapter Name	New (N) Revised (R)	Chapter Code	Last Revision Date	Handbook Assignment	Status
AM-355 Stainless Steel	R	1504	3/65	ASMh(a)	Published — first supplement for 1982
AM-350 Stainless Steel	R	1505	3/65	ASMh	Published — second supplement for 1982
AISI-M50 Steel	N	1227	—	ASMh	Published — third supplement for 1982
AISI-4340 Steel	R	1206	6/75	ASMh	Published — fourth supplement for 1982
Aluminum Alloy 2124	R	3221	6/76	ASMh	Published — first supplement for 1983
Aluminum Alloy 7049	R	3217	3/72	ASMh	In final preparation for publication
Aluminum Alloy 7475	R	3220	6/73	ASMh	Technical review
Ni-Base Alloy, MAR-M-247	N	4217	—	ASMh	In compilation
9-Ni-4 Co Steel	R	1221	3/71	ASMh	In compilation
Ni-Base Alloy, RENE-80	R	4214	3/77	ASMh	Proposal stage
Ni-Base Alloy, RENE-95	N	—	—	ASMh	Proposal stage
Hastelloy X	R	4112	3/67	ASMh	In compilation
IN 738 and 739	N	—	—	ASMh	Proposal stage
Wrought Titanium Selector Chart	N	—	—	SAH(b)	Published — first supplement for 1982
Aluminum Alloys 5083 and 5086	N	—	—	SAH	Published — second supplement for 1982
Wrought Aluminum Selector Chart	R	—	1973	SAH	In final preparation for publication
High Strength, Low-Alloy Steels	R	—	1973	SAH	Proposal stage
Structural Steel Selector Chart	R	—	1973	SAH	Proposal stage

(a) ASMh = Aerospace Structural Alloys Handbook.

(b) SAH = Structural Alloys Handbook.

TABLE 4. STATUS OF MCIC STATE-OF-THE-ART REPORTS

Publications	Activity Status ^(a)	Estimated Cost to Complete, \$	Publication Date		Remarks
			Previous	Revised	
<u>In Process</u>					
Complete Revision and Update of Hot Isostatic Processing	P	—	—	—	Published 2/17/83
Isothermal, Precision Forging	TR	30,000	4/83	6/83	COTR Review
Laser Processing of Materials	E	40,000	3/83	8/83	Editing and composition
Rapid Quenching of Ceramics	TP	37,500	3/83	9/83	In compilation
<u>Proposed/Under Consideration</u>					
Weldment Evaluation Methods	—	(40,000)	—	—	—
Complete Revision of Corrosion of Metals in Marine Environments	—	(60,000)	—	—	Will be started in 1983

(a) Legend: TP — technical preparation, TR — technical review, E — editing, P — publication.

Analysis of the responses showed that the use rate for individual items varied from two times per year to four times per day with the average about 1 or 2 times per week. The savings realized from use of the publications ranged from \$100 per year to over \$10,000, with the average savings calculated to be about \$4,500 per year. The number of projects using MCIC publications varied from two to greater than ten (the average was 5.8 projects). Some users requested more detail, but this appeared to be related to a particular individual's need and not amenable to the overall compilation of the document.

In general, this limited evaluation of MCIC reports, handbooks, and databooks indicates that a publication is useful to four projects/tasks about 100 times per year (twice per week) and saves the user about \$4,500 per year. Conservatively, the evaluation means that the 2410 MCIC publications sold in the U.S. during the past year were used about 240,000 times and saved the Government about \$11 million on 14,000 projects/tasks. Thus, the Department of Defense has realized a return on investment of more than 10 to 1 for MCIC on publications alone.

Sales

Although sales of publications have increased slightly during this contract year, the publication of several new titles within the recent past and the sale of the two former MPDC databooks (ASMH and SAH) should continue to provide an increase in sales activities during the next contract period.

CURRENT AWARENESS BULLETIN

The MCIC Current Awareness Bulletin (CAB) is designed to fulfill the MCIC contract requirement to alert periodically its users to important technical developments within the Center's materials, properties, and processes scope. Presently, the CAB is published monthly. Those scientists and engineers at Battelle's Columbus Laboratories with special expertise in a materials field present special articles covering technical meetings or state of the art of technical subjects of particular interest to the DoD materials community. They also present highlights of selected current MCIC acquisitions. In addition, a special news section features items of interest to users. The CAB format may include the following material:

LEAD ARTICLE(S)

METALS

Light Metals
Rapidly Solidified Alloys
Steels
Stainless Steels
Superalloys
Refractory Metals
Metals Fabrication
(Metalworking, Joining)
Testing-Method Evaluation

CERAMICS

Structural
Refractory
Special Glasses
Electronic
Carbon-Graphite

MCIC NEWS

Meetings/Symposia
Call for Papers
Recent Reports and Books
R&D Contracts.

CORROSION/COMPATIBILITY

The CAB is provided upon written request without charge to U.S.-based users of the Center. Updating of the distribution list during the year has been based on the supposition that recipients will either cancel subscriptions or that undelivered CABs will be returned. Presently (April 30, 1983), the distribution list has about 3,500 subscribers.

During the Twentieth Quarter, Bulletins 120/121 (combined) and 122 were published. Pertinent statistics for these issues are:

Issue	Date	Number of References Cited			Totals
		Metals	Ceramics	Corrosion	
120/121	February/March 1983	8	4	1	13
122	April 1983	<u>4</u>	<u>12</u>	<u>6</u>	<u>22</u>
	Totals	12	16	7	35

Publication statistics of CAB for this annual reporting period (including the Twentieth Quarter) are given in Table 5. A total of 11 issues (Numbers 111-122) were published. These represent a total of 97 pages (which include NEWS sections), 177 digests of technical accessions, and 13 lead articles or meeting reports.

**TABLE 5. PUBLICATION STATISTICS OF THE "CURRENT AWARENESS BULLETIN"
FOR THE PERIOD, MAY 1982 THROUGH APRIL 1983**

Quarter	Issue No.	Date	Lead Articles(a)	No. Reports Reviewed	No. References Cited	Pages
1	111	May 1982	1	19	18	12
	112	June 1982	1	20	21	12
	113	July 1982	1	6	10	8
2	114	August 1982	1	16	16	8
	115	September 1982	1	16	17	8
	116	October 1982	1	10	10	8
3	117	November 1982	1	9	11	7
	118	December 1982	3	7	23	8
	119	January 1983	—	10	16	8
4	120/121	February/March 1983	2	15	13	11
	122	April 1983	1	11	22	7
Total			13	139	177	97

(a) Special technology articles or meeting reports.

In addition to CAB, a semiannual periodical co-sponsored by the Metals and Ceramics Information Center and the Metal Properties Council (MPC) has been published and distributed free of charge to MCIC users for many years. Entitled "MCIC/MPC Review of the Low-Temperature Properties of Metals", it is now authored by Mr. F. J. Jelinek, an MCIC staff member. The title is descriptive of the scope of materials accessions covered in this semiannual publication. During this reporting period, two publications were issued and distributed (September, 1982 and March, 1983); 20 references on the subject were reviewed.

A limited, random survey of CAB readers was also conducted during the Twentieth Quarter to solicit their opinions on the usefulness of the publication. The significant majority of the responders indicated that the publication was technically and editorially excellent. Many readers indicated that they do not have time to actively pursue the report and journal literature, and therefore, the review style of CAB allows them to stay "in touch" with certain advanced technology areas. Some further suggestions were received on format and items to be included in each issue; some of these will be incorporated in the months ahead.

The Battelle personnel who contributed to the CAB publications in the Twentieth Quarter are listed in Appendix B. The contributors to previous issues are listed in previous quarterly reports of the contract period.

INQUIRY SERVICES

Technical Inquiries

A technical-inquiry service, designed primarily for the use of the Department of Defense, its agencies, and its contractors, has been provided by the MCIC for many years. MCIC has been distinguished as an Information Analysis Center by its rapid-response service made possible by the availability of a select group of skilled scientists and specialists of Battelle's Columbus Laboratories. By placing the inquirer in direct contact with an appropriate technical authority, answers can be provided to the degree of depth required. Answers may be executed through the use of telephone discussions, on-line computer printouts, letter reports, on-site visits, and MCIC-published reports and handbooks.

Table 6 presents a summary of the statistics for the technical inquiries processed during the 12-month period, May 1982 through April 1983. Classification of these technical inquiries is provided in Table 7. Twentieth Quarter statistics are included in both tables.

During this annual-report period, MCIC processed 410 requests for technical assistance. In addition, 23 requests were cancelled. During this period, MCIC responded to about 95 percent (410/433) of the inquiries received, which is the highest response in five years. MCIC will continue to provide this service and recover as much as possible from the inquirers.

Of the completed inquiries, 98 were subject to a user charge, and 312 were answered without charge. Many of the 410 technical inquiries were complex and multifaceted, although counted statistically as single inquiries. Ordinarily each of the no-charge inquiries represented a minimal effort by an MCIC staff member or a Battelle engineer, requiring an hour or less of effort to provide a satisfactory answer. On the other hand, cancelled inquiries often require more MCIC effort in addition to the technical effort required to provide a cost estimate. Note that a cancelled inquiry is defined as one that has been priced (sometimes even processed during the cursory evaluation) but not completed because final authorization to proceed was never received by MCIC.

Often, various technical inquiries identify an R&D or information problem which subsequently leads to a proposal and project to be conducted by one of Battelle's research groups. In these cases, the MCIC staff refers the caller to an appropriate scientist for further discussion. In this reporting period 11 such inquiries were referred in this manner. Of these, two have already resulted in Battelle projects totaling \$20,000. The remainder are still in various stages of discussion. Of course, our scientific staff at Battelle is also frequently called upon to answer specific questions on a "no-charge" basis. The availability of scientific staff, in all fields, within the same organization is required for the effective and successful operation of MCIC.

Also in this period, a random survey was conducted with many of our technical inquiry users to assess the usefulness of the service. In all cases, the response was very positive. Specifically cited were the tangible savings of time and money (for some users as much as \$10,000), and the less tangible, but nevertheless important, benefit of having another "opinion" where the dialogue between caller and responder often pointed out other options and alternatives.

TABLE 6. TECHNICAL INQUIRY STATISTICS FOR THE PERIOD, MAY 1982-APRIL 1983

Category	Number of Inquiries											
	Seventeenth Quarter			Eighteenth Quarter			Nineteenth Quarter			Twentieth Quarter		
	SC(a)	NC(b)	Tot.	SC	NC	Tot.	SC	NC	Tot.	SC	NC	Tot.
Industrial	23	71	94	23	56	78	27	57	84	19	69	88
Government	-	6	6	-	12	12	-	3	3	2	15	17
Academic	1	3	4	-	6	6	-	2	2	1	2	3
Foreign	-	1	1	-	3	3	1	3	4	1	4	5
Total	24	81	105	23	76	99	28	65	93	23	90	113
Annual												
Technical	4	63	67	4	50	54	5	57	62	5	70	75
Technical (bibliographic)	20	18	38	19	26	45	23	8	31	18	20	38
Total	24	81	105	23	76	99	28	65	93	23	90	113
SC Income	\$1,830			\$1,384			\$1,882			\$1,925		
NC Cost		\$4,500			\$3,700			\$3,200			\$5,400	
Cancelled Inquiry Cost(c)		\$ 800(11)			\$ 150(3)			\$ 200(4)			\$ 250(5)	
										\$7,021		
											(\$16,800)	
											(\$ 1,200)(23)	

(a) SC - Service Charge.

(b) NC - No Charge.

(c) Numbers of cancelled inquiries are given in brackets.

TABLE 7. CLASSIFICATION OF TECHNICAL INQUIRIES PROCESSED BY MCIC
DURING THE PERIOD MAY 1982 - APRIL 1983

Classification	Number of Inquiries								Annual Total	
	Seventeenth Quarter		Eighteenth Quarter		Nineteenth Quarter		Twentieth Quarter			
	No.	(Percent)	No.	(Percent)	No.	(Percent)	No.	(Percent)	No.	(Percent)
Materials										
Metals	75	(72)	77	(78)	66	(71)	76	(67)	294	(72)
Ceramics	19	(18)	20	(20)	20	(21)	34	(30)	93	(23)
Other	11	(10)	2	(2)	7	(8)	3	(3)	23	(5)
Total	105		99		93		113		410	
Technical Scope										
Properties	60	(57)	47	(47)	46	(49)	47	(42)	200	(49)
Processing	17	(16)	22	(22)	19	(20)	29	(26)	87	(21)
Corrosion	11	(10)	7	(7)	12	(14)	20	(17)	50	(12)
Material Selection	12	(12)	17	(18)	14	(15)	16	(14)	59	(14)
Material Identification	3	(3)	2	(2)	2	(2)	1	(1)	8	(2)
Test Methods	2	(2)	4	(4)	—	—	—	—	6	(2)
Total	105		99		93		113		410	

The charges for the 98 service-charge (SC) inquiries ranged from \$35 to \$680 for a single inquiry and represent a total invoiced amount of \$7,021. (Actual income for this annual period was \$4,632.) The 312 no-charge (NC) inquiries credited at approximately \$50 per inquiry or per hour, represent a cost of \$16,800; the 23 cancelled inquiries, credited in the same manner, represent a cost of \$1,200.

Listings of the specific requestors for whom assistance was provided and the Battelle-Columbus personnel who were directly involved in technical-inquiry services during the Twentieth Quarter are given in Appendices C and B, respectively, in this report. Inquiry listings and personnel involved in inquiry services for the other quarterly periods are given only in appendix sections for previous quarterly reports.

Nontechnical Inquiries

Significant effort also is expended in answering a variety of queries unrelated to MCIC's technical scope. A statistical summary of the number of inquiry responses to the sectors of the user audience is given in Table 8.

TABLE 8. NONTECHNICAL INQUIRY RESPONSES

User Audience	Quarter				Total	
	17	18	19	20	No.	(Percent)
Government	8	15	11	16	50	(10)
Industrial	78	99	97	84	358	(69)
Academic	16	8	8	10	42	(8)
Foreign	<u>17</u>	<u>23</u>	<u>16</u>	<u>13</u>	<u>69</u>	(13)
Total	119	145	132	123	519	

In the annual report period approximately 519 nontechnical inquiries were answered by MCIC management and support staff. Because of the nature of these inquiries, this is a conservative estimate of the actual nontechnical responses. Of these inquiries, 358 were industrial, 50 Government, 42 academic, and 69 foreign. Typical inquiries represent questions related to:

- Products and services of the Center
- Quotations on MCIC products/services
- Orders for MCIC reports/handbooks
- Information on CAB and its availability
- Request for TML, DMIC, and DCIC reports
- Identification and source of Government reports
- Requests for references cited in publications
- Sources for acquisition of journal articles
- Source(s) of technical information not in MCIC scope.

SPECIAL STUDIES/TASKS

This category covers tasks which can be described as "super" inquiries. The tasks, under separate funding by agencies of DoD through supplements to the basic MCIC contract, generally require a substantial amount of technical effort extending over a period of time. Each inquiry can involve one or more phases of study which are assigned to various research staff within Battelle. These tasks are monitored by MCIC, whose combination of information and data resources and professional skills in pertinent fields often make it possible to save both time and costs in completing each task. Through such assignments, the Government is able to capitalize further on the substantial investment it has made in the creation of the technical information services.

Table 9 presents a summary of the Special Studies which were active during this contract period. Task progress for the Twentieth Quarter can be summarized as follows: new (1), completed (0), continuing (8), additional funding (3).

It is important to note that two Special Studies, continuous since the inception of the current MCIC contract, have been continued through this reporting period:

- Establishment and Operation of a Carbon/Carbon Composites Materials Database (U.S. Air Force and Navy Sponsorship)
- Preparation of Journal for Army Manufacturing Technology Database (U.S. Army/AMMRC).

Both of the programs continued to be well received by the technical community.

MARKETING AND PROMOTION

In accordance with DoD policy, a service charge program was initiated in 1972. Since that time 75 technical documents (not including CAB) have been generated and 68 are still being sold through MCIC's marketing program. At the present time, marketing is being conducted by six outlets in addition to MCIC. Those agencies having a formal marketing agreement with MCIC include:

NTIS (worldwide)

American Ceramic Society

Metal Powder Industries Federation (U.S. only)

Neutrino/MRI (Japan)

Allied Publishers Private, Ltd. (India)

Aluminium Verlag GmbH (West Germany).

TABLE 9. SUMMARY OF SPECIAL STUDIES/TASKS

Title or Description	Contract Modification	Funding Level	Sponsoring Agency	Period of Performance
Carbon/Carbon Composites Materials				
Evaluate Data	P00002	\$ 35,000	Air Force/RPL	Completed Oct 1978
Establishment and Operation of Data Base	P00011	50,000	Air Force/AFML	5 Jan 1979 - (Continuing)
	P00012	80,000	Navy/NAVSEA	
	P00022	50,000	Air Force/RPL	
	P00022	55,000	Air Force/AFML	
	P00025	65,000	Navy/NAVSEA	
	P00030	110,000	Air Force/AFFTC/PKA: Navy/NAVSEA	
	P00046	52,000	Air Force/AFWAL/ACFB; AFFTC/PKX	
	P00056	30,000 1,024(a)	AFFTC/PKX	
Manufacturing Technology Plan	P00003/4	85,000	Navy/NAEC	Completed Sep 1979
	P00006	85,000	Navy/NASC	
Silicon Nitride Properties	P00001	6,000	AMMRC	Completed Dec 1978
Technical Assistance in Establishment of Army Battlefield Systems Integration, Base Terminology Data Base	P00001	74,976	AMMRC	Completed Apr 1980
	P00013	3,024		
	P00017	28,750		
	P00021	50,000		
Preparation of Journal for Army Manufacturing Technology	P00005	34,370	AMMRC	4 Aug 1978 - (Continuing)
	P00009	95,346		
	P00015	11,246		
	P00018	127,000		
	P00021	22,500		
	P00030	153,385		
	P00036	153,748		
	P00050	164,657		
		57,908(a) 20,150(b)		
MTAG Support	P00028	28,773	AMMRC	Completed Jan 1981
	P00030	14,529 4,000(c)		
Publication of Proceedings of Tri-Service Corrosion Conference	P00008	7,855 7,000	AMMRC ARRADCOM	Completed Jun 1979
Technical Advisory Services for AMMRC and QUSDR	P00005	8,500	AMMRC	Completed Apr 1979
Ship Structural Research and Development Requirements	P00007	20,000	Navy/NSRDC	Completed Jun 1979
Fourth Conference on Fibrous Composites in Structural Design	P00010	6,975 16,602(d)	AMMRC	Completed Mar 1981
Third Army Materials Technology Conference on Ceramics for High-Performance Applications	P00013	24,985 16,848(d)	AMMRC	2 Mar 1979 - 30 Apr 1983
Crack Arrest Development Plan	P00019	20,000	Navy/NSRDC	Completed Oct 1980

TABLE 9. (Continued)

Title or Description	Contract Modification	Funding Level	Sponsoring Agency	Period of Performance
CAD/CAM Technology Transfer (Phase I)	P00021	\$ 8,900	AMMRC	Completed Apr 1980
DoD Materials/Structural Technology Conference	P00027	20,000	AFWAL	Completed Apr 1981
	P00028	20,000	Navy/NAVSEA	
	P00030	20,000	AMMRC	
Welding Procedures for Marine Propellers	P00031	40,000	Navy/NAVSEA	Completed Jul 1982
Technical Support for TACOM Manufacturing Technology Conference	P00037	8,196 12,905 ^(f)	AMMRC	Completed Aug 1981
Use of Ceramics in Gun Barrels	P00038	17,000	AMMRC	Completed Jan 1982
	P00050	1,700		
Technical Review on Welding Fluxes for Titanium Alloys	P00039	20,000	Navy/NSRDC	Completed Mar 1982
MTAG 81 Technical Support	P00050	10,688	AMMRC	Completed Oct 1981
MTAG 83 Technical Support	P00050	5,420	AMMRC	29 Apr 1982 – 31 Dec 1983
Automated Advanced Batch Metal Removal System	P00050	12,069	AMMRC	Completed 30 Apr 1982
Technical Support – MIL-STD-1515	P00051	67,000	WPAFB/ASD	11 Jun 1982 – (Continuing)
	P00057	21,000 ^(e)		
Technical Assistance – Welding	P00052	5,000	AMMRC	Completed Apr 1982
HSLA Steels	P00053	35,000	Navy/NSRDC	10 Aug 1982 – 30 Apr 1983
Armor Conference	P00054	32,875 3,388 ^(f)	Army/TACOM	21 Sep 1982 – 30 Jun 1983
Foreign Ship Hull Technology	P00054	15,000	Navy/NSRDC	21 Sep 1982 – 30 Apr 1983
Track and Suspension Conference	P00056	12,000	Army/TACOM	Completed Apr 1982
		12,015 ^(f)		
Technical Support – PEP Conference	P00062 ^(g)	21,959 ^(e)	AMMRC	Completed Apr 1983

(a) Income previous quarters.

(b) Income for Twentieth Quarter. Journal income includes subscriptions through 1982.

(c) Net from registration fees (after payment of MTAG Conference Expenses).

(d) Conference Registration Fees – required to cover conference expenses, publication of proceedings for authors and all attendees.

(e) Special task funding received in Twentieth Quarter.

(f) Conference Registration Fees – required to cover conference expenses.

(g) Date of contract modification is 4 May 1983; funding not included in any Contract Status Reports.

TABLE 10. MCIC PROMOTIONAL EFFORTS (TWENTIETH QUARTER)

Item Promoted	Short Title	Type of Promotion	Conference Sponsor, Location, and Date/Audience Size
MCIC User's Guide U.S. Army ManTech Journal	List of publications and back issues of <u>ManTech Journal</u>	Display and handout	Society of Automotive Engineers (SAE) Annual Meeting, Detroit, Feb. 28-Mar. 4, 1983/25,000
MCIC User's Guide	List of publications and description of MCIC	Display and handout	Software Expo-East, New York City, Mar. 15-17, 1983/3,000
MCIC User's Guide	List of publications	Display and handout	Technology Exposition - 1983, Orlando, Florida, March 22-25, 1983/2,500-3,000
MCIC User's Guide U.S. Army ManTech Journal	List of publications, description of MCIC, and back issues of the <u>ManTech Journal</u>	Display and handout	American Society of Mechanical Engineers (ASME), National Design Engineering Show, Chicago, Mar. 28-31, 1983/5,000
MCIC User's Guide, MCIC-78-37 and 81-42	List of publications, Corrosion of Metals in Marine Environments, and Corrosion Fatigue of Metals in Marine Environments	Display and handout	National Association of Corrosion Engineers, Anaheim, California, April 18-21, 1983/2,500
MCIC User's Guide, MCIC-HB-07V1, HB-07V2, HB-07V3	List of publications, and Engineering Properties of Selected Ceramics, Nitrides, Carbides, and Single Oxides	Display and handout	American Ceramic Society Annual Meeting, Chicago, April 24-27, 1983/1,500-2,000

In this annual period (May 1982 - April 1983), 3064 documents were sold for a projected income to MCIC of \$191,205. The documents included 864 technical reports (\$29,165), 2128 handbooks/databooks and subscriptions to the ASMH or SAH annual supplement service (\$158,518), and 72 special documents (\$3,522). Summary tables listing the documents sold during this annual report period are given in Appendix D.

During the Twentieth Quarterly period, 924 documents and supplement subscriptions were sold for a net value of \$57,549. The documents included 297 technical reports (\$11,084), 454 handbooks/databooks (\$16,986), 203 handbooks and subscriptions to the annual supplement services for the ASMH or the SAH (\$28,848), and 13 special documents (\$721). Summary tables listing the various documents sold during this report period are given in Appendix D.

The rental or sale of the MCIC films entitled, Scanning Fractures with the Electron Microscope, and Ceramics and Metals in Medical Prosthetics provided a gross income for the past year of only \$200 of which \$140 was received in the Twentieth Quarter. Because of the productin cost, no new MCIC films are planned at this time.

Experience has shown that the sale of MCIC's products and services requires aggressive promotion. Consequently, MCIC maintains a modest promotional program within the limitations of resources available. The promotional efforts conducted during the Twentieth Quarter are summarized in Table 10. In addition, the revised MCIC "User's Guide and Publication List" is being used to respond to inquiries and is included with all reports and handbooks sold.

The promotional program will continue with special mailings, inserts in technical journals as book reviews, special announcements in pertinent trade literature, and displays at technical meetings and trade shows.

Promotional activities of the previous report periods are given in the prior quarterly reports in this annual period.

Meetings Attended

In support of MCIC's program management, operation, and technical activities, personnel of both the Center and Battelle's Columbus Laboratories attended seven meetings during this quarterly report period. The following meetings were attended in the Twentieth Quarter; meetings attended during the Seventeenth through Nineteenth Quarters were given in the respective quarterly reports.

<u>Personnel</u>	<u>Meeting</u>	<u>Location</u>	<u>Date</u>
H. Mindlin	Project Activities	AMMRC, Watertown, MA	February 11
	SURVIAC Briefing	Naval Surface Weapons Center White Oak, MD	March 1, 2, 3
	IAC Managers	(ditto)	March 4
	ASME Workshop on Electronic Handbook	NBS, Gaithersburg, MD	April 11

<u>Personnel</u>	<u>Meeting</u>	<u>Location</u>	<u>Date</u>
	Project Activities	DLA, Alexandria, VA	April 12
	Project and Special Tasks	AMMRC, Watertown, MA	April 14
	Handbook and Database Activities	(Commercial concern) New York City	April 26

Twenty-eight meetings were attended during this annual period.

Visitors

The following government, industry, and foreign representatives visited MCIC during the Twentieth Quarter. Several of the visits were related to special tasks; others were related to specific MCIC operations or for overviews of this program. Visitors in previous quarters were reported in those respective reports.

<u>Name/Area of Interest</u>	<u>Company/Organization</u>
G. A. Gorline/Manufacturing Technology	AVRADCOM, St. Louis
C. Caldwell/Ceramics and Manufacturing Technology	Babcock and Wilcox
W. R. Warke/Corrosion, Metals Properties, and Failure Analysis	Standard Oil
W. Peters/R. Haynes/MCIC Operations	DOE/PETC
Maj. Santelli/Maj. Loose/MCIC Operations	Brooks AFB
Dr. G. V. Nelson/MCIC Operations	Celanese
J. L. Bauer/Database Activities	JPL/NASA

INCOME AND COST RECOVERY

In accordance with DoD policy, in January, 1972, MCIC instituted a service charge program to recover part, or all, of the costs associated with the products and services of the Center. This income is intended to offset many costs and to provide for the maintenance and/or expansion of services to the DoD and the related technical community.

In addition to the Contract Status Reports presented in Appendix A, several tables have been prepared to cover both the fifth year (this reporting period) and a five-year summary. Table 11 is an income summary by quarters for the year ending 30 April 1983; Table 12 indicates the direct government (DLA) funding on an annual basis. A five-year summary is shown in Table 13.

TABLE 11. INCOME SUMMARY FOR ANNUAL PERIOD (MAY 1, 1982–APRIL 30, 1983)

Product/Service	Income, \$				Annual Total
	17th Quarter	18th Quarter	19th Quarter	20th Quarter	
Direct Income(a)					
Publication					
Reports	5,291	5,009	4,759	9,445	24,504
Handbooks	19,658	10,020	6,867	12,511	49,056
ASMH/SAH	51,481	12,855	38,446	60,115	162,897
NTIS	3,326	6,462	—	—	9,788
Films	45	15	—	140	200
Inquiry Services	224	1,620	994	1,794	4,632
Special Studies/Tasks	96,499	94,382	46,587	44,539	282,007
Miscellaneous(b)	363	474	1,111	460	2,408
Subtotal	176,887	130,837	98,764	129,004	535,492
Indirect Income(c)					
Technical Assistance	4,500	3,700	3,200	5,400	16,800
Other Contracted Activities	—	—	5,925(d)	20,000(d)	25,925
In-House Inquiry Services(e)	730	1,020	995	400	3,145
Subtotal	5,230	4,720	10,120	25,800	45,870
Total	182,117	135,557	108,884	154,804	581,362

(a) Actual income credited directly to contract from sale of products and services as shown.

(b) Special publications or products, listed in Appendix D.

(c) Constitutes (1) separately contracted Battelle studies for either government or industrial sponsors and (2) costs of services provided to in-house programs as indicated in Appendix B for identification.

(d) MPC funding for "Low Temperature Reviews", 19th Quarter; Other Battelle projects, 20th Quarter.

(e) Services provided by MCIC personnel and charged directly to other Battelle projects or accounts. Amounts are estimates based on time.

**TABLE 12. SUMMARY OF BASIC FUNDING AND COST RECOVERY FOR
MAY 1, 1982, THROUGH APRIL 30, 1983**

Contract Modification	Period Covered	No. of Months	Direct Funding Amount, \$	Annual Rate, \$	Portion Applied to Current Year, \$
48	Apr-Sep 82 (FY82)	6	56,285(a)	—	46,904
49	Apr-Sep 82 (FY82)	6	320,500	641,000	267,083
55	Oct-Dec 82 (FY83)	3	175,000	700,000	175,000
58	Jan-Mar 83 (FY83)	3	175,000	700,000	175,000
60	Apr-15 Jun 83 (FY83)	2½	145,833	700,000	58,333
Total — Basic MCIC Operations					722,320
Direct Income, \$ (Ref Table 11)					535,492
Percent Recovery					74.1

(a) One-time funding for ASMH/SAH.

TABLE 13. FUNDING AND EXPENDITURE SUMMARY, MAY 1, 1978 THROUGH APRIL 30, 1983

Contract Year Ending April	Direct Funding, \$	Income \$, Products and Services					Expenditures(a), \$		
		NTIS	MCIC Direct	Special Tasks		Annual Totals	MCIC Operations	Special Tasks	Total
				MIPR	Income				
1979	755,000	2,954	80,133	635,277	25,181	743,545	831,338	339,284	1,170,622
1980	755,000	8,571	116,546	382,150	23,363	510,630	797,209	553,326	1,350,535
1981	755,000	11,061	82,348	471,687	10,285	575,381	869,835	444,939	1,314,774
1982	1,033,100	6,469	139,547	445,458	23,676	615,150	807,871	415,938	1,223,809
1983	495,833(b)	9,788	243,898	217,875	64,132	535,492	929,223	397,977	1,327,201
Subtotal	—	38,843	662,272	2,132,447	146,637	—	4,235,476	2,151,464	6,386,941
Total	3,793,933			2,980,199(c)					
Total Available \$						6,774,132			

(a) Includes fee, through April 30, 1983.

(b) Includes 45-day extension to June 15, 1983.

(c) Income represents a 79 percent recovery based on direct funding.

As noted in these tables, at the end of the basic five-year contract, MCIC recovered about 79 percent of the direct funding. The sale of products and services is only one indication of the technical assistance being provided by MCIC to DoD and the technical community at large. The ASMH and SAH continue to be among the best metals properties reference books; in addition, the MCIC staff continues to provide rapid response and specialized services to many DoD components by handling special tasks as assigned.

Despite increased costs, MCIC has been able to maintain a level of service and products that still meet contractual requirements. The effects of inflation and higher costs are graphically reflected in Figure 2. (Expenditures and hours for 1982-83 do not include \$15,784 or hours for ASMH consultants to reflect MCIC's direct costs more accurately.) The 1982-83 figures represent more professional hours expended in state-of-the-art reports and the costs of producing the ASMH and SAH (more printing with fewer associated hours).

The increasing costs to operate MCIC have resulted in general actions to reduce costs:

1. Reduced rate of accessioning of new data--resulting in a growing backlog of data to be reviewed and entered into the database.
2. Elimination of MCIC handbook efforts. With the relatively high cost to produce a handbook, the publication and printing of MCIC-authored handbooks have been suspended. Only the ASMH and SAH are now being maintained by MCIC.
3. Fewer SOARs in future contracts. It will not be possible to maintain a schedule of two new SOARs every year. In addition, foreign distribution (export control) will affect sales income for these SOARs.
4. Limitation of technical input to Current Awareness Bulletin (CAB), restricting input primarily to DoD-related efforts has enabled the CAB staff to maintain quality input with constant funding. Also, monthly publication may be too frequent.
5. Delay of maintenance items. Ongoing tasks related to both the library and database maintenance have been suspended pending availability of resources.

In addition to the maintenance of the technical quality of MCIC's products and services, future activities will assure cost-effective utilization of contract funds to attain MCIC's goals. The scope of MCIC's operation will continue to be assessed on a regular basis to maintain efforts within the available financial resources.

FUTURE PLANNING

The basic operational procedures that have been developed by Battelle through its operation of the Metals and Ceramics Information Center have permitted the effective continuation of the key functions of this Center. Pertinent and timely services to the Department of Defense and its technical community have been and will be continued within the time and resources available for MCIC's operation.

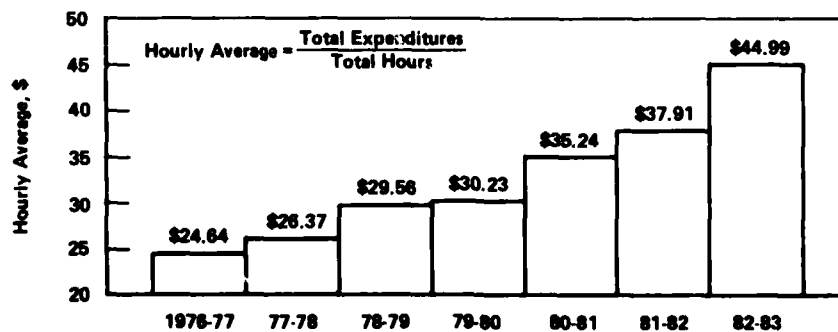
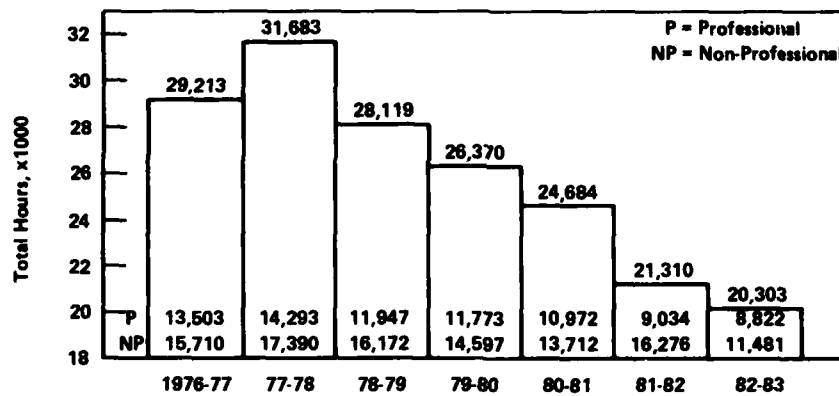
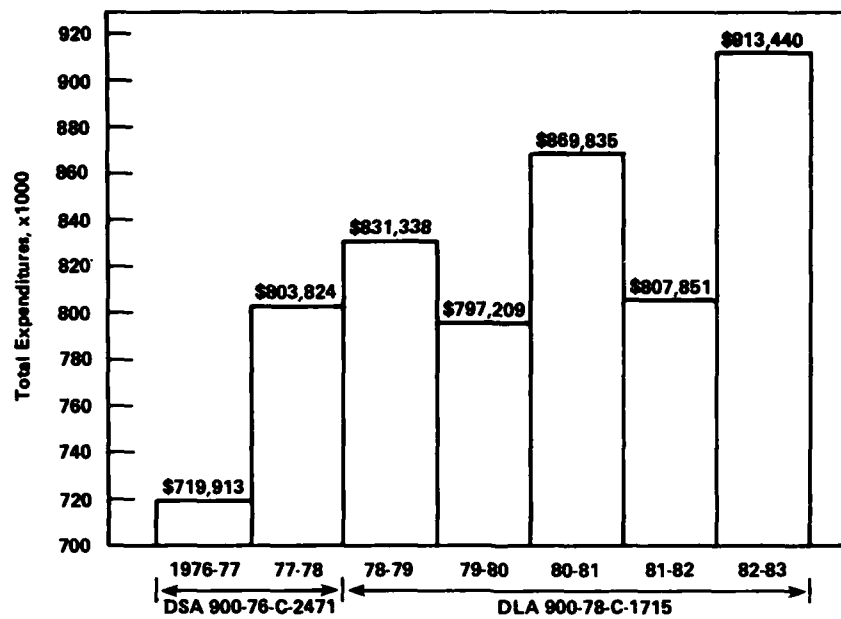


FIGURE 2. SEVEN-YEAR FINANCIAL SUMMARY OF MCIC BASIC OPERATIONS

The recent, continuing problems of rising costs and a constant level of funding have been exacerbated by the budget reductions for FY 82 and FY 83. The increase in sales income has not been sufficient to offset the rising costs, resulting in a further tightening of MCIC operations.

As a continuous operation since 1955, MCIC has established itself in the technical community as a reliable source of materials data and information. Unless the direct funding to the Center can be increased, further reductions of services and coverage will result in the erosion of a long-established capability.

APPENDIX A

CONTRACT STATUS REPORTS

TABLE A-1. FINANCIAL STATISTICS (TWENTIETH QUARTER)

INFORMATION ANALYSIS CENTER CONTRACT STATUS REPORT	AREA TITLE	NAME OF INFORMATION ANALYSIS CENTER METALS AND CERAMICS INFORMATION CENTER	QUARTER ENDING APRIL 30, 1983				CUMULATIVE THRU	
			OUTPUT UNITS PRODUCED	MANHOURS EXPENDED			COSTS INCURRED	
				PROF (a) PERSONAL	NON-PROF (b) PERSONAL	TOTAL	DIRECT (b)	INDIRECT (c) TOTAL
1. ACQUISITION AND INPUT OF SOURCE INFORMATION				568	1,137	1,683	23,778	33,595
2. DOCUMENTS ACQUIRED			814					57,324
3. DOCUMENTS REVIEWED			814					
4. DOCUMENTS CATALOGED			731					
5. TECHNICAL INQUIRY RESPONSES PROVIDED			96	338	68	406	9,824	13,345
6. BIBLIOGRAPHIC INQUIRY RESPONSES PROVIDED			18	-	-	-	-	-
7. HANDBOOKS/DATA BOOKS COMPLETED				267	255	522	6,874	31,585
8. NEW CHAPTERS/PAGES COMPLETED			1,142					38,269
9. REVISED CHAPTERS/PAGES COMPLETED			1,130					
10. DATA SETS COMPILED			-					
11. STATE-OF-THE-ART STUDIES COMPLETED			1	455	214	669	12,502	30,789
12. CRITICAL REVIEWS AND/OR TECHNOLOGY ASSESSMENTS COMPLETED			-	-	-	-	-	-
13. CURRENT AWARENESS AND PROMOTION EFFORTS				489	966	1,455	21,043	40,259
14. NUMBER NEWSLETTERS AND/OR ANNOUNCEMENTS PUBLISHED			210					61,302
15. NUMBER MEETINGS, CONFERENCES ETC SUPPORTED			7					
16. OTHER (Special Tasks) (g)			1	998	310	1,308	25,123	69,012
17. MANAGEMENT AND SUPPORT				273	505	778	14,935	22,060
18. UNASSIGNABLE INDIRECT COSTS (Contractual Fee)				-	-	-	-	12,422
19. TOTAL				3,376	3,455	6,831	113,830	253,087
								368,897
								129,004

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FOOTNOTES FOR TABLE A-1

- (a) According to Battelle definition of personnel.
- (b) Cost of staff time directly related to MCIC operations and special studies/tasks.
- (c) Costs other than staff time.
- (d) Actual income received in quarterly period. See Table 11 for complete breakdown.
Items on lines 4 and 5 include NTIS income; line 8 includes subscriptions,
registration fees, and MIPR'd funds for special tasks.
- (e) Two Current Awareness Bulletins.
- (f) Six booth displays/handouts (see Table 10).
- (g) Reference Table 9 for breakdown and listing of tasks.

TABLE A-2. FINANCIAL STATISTICS (FIFTH ANNUAL)

INFORMATION ANALYSIS CENTER CONTRACT STATUS REPORT			NAME OF INFORMATION ANALYSIS CENTER METALS AND CERAMICS INFORMATION CENTER					QUARTER ENDING		CUMULATIVE THRU MAY 1982-APRIL 1983
AREA TITLE	OUTPUT UNITS PRODUCED	MANHOURS EXPENDED			COSTS INCURRED			TOTAL	INCOME	
		PRO- FESSIONAL	NON-PRO- FESSIONAL	TOTAL	DIRECT	INDIRECT	TOTAL			
1. ACQUISITION AND INPUT OF SOURCE INFORMATION		2,191	4,599	6,790	89,404	132,804	222,208			
a. DOCUMENTS ACQUIRED	3,528									
b. DOCUMENTS REVIEWED	3,528									
c. DOCUMENTS CATALOGED	3,069									
2. TECHNICAL INQUIRY RESPONSES PROVIDED	278	1,134	378	1,512	32,369	44,977	77,336	2,759		
3. BIBLIOGRAPHIC INQUIRY RESPONSES PROVIDED	132	-	-	-	-	-	-	1,873		
4. HANDBOOKS/DATA BOOKS COMPLETED		1,099	815	1,914	24,350	92,173	116,523	218,680		
a. NEW CHAPTERS/PAGES COMPLETED	3/72									
b. REVISED CHAPTERS/PAGES COMPLETED	4/148									
c. DATA SETS COMPILED	-	-								
5. STATE-OF-THE-ART STUDIES COMPLETED	1	1,228	432	1,660	30,047	70,651	100,698	27,765		
6. CRITICAL REVIEWS AND/OR TECHNOLOGY ASSESSMENTS COMPLETED	-	-	-	-	-	-	-	-		
7 CURRENT AWARENESS AND PROMOTION EFFORTS		2,252	3,182	5,434	86,166	162,595	248,761	2,408		
a. NUMBER NEWSLETTERS AND/OR ANNOUNCEMENTS PUBLISHED	12/26									
b. NUMBER MEETINGS CONFERENCES ETC SUPPORTED	31									
8. OTHER (Special Tasks)	6	4,323	1,618	5,941	106,262	277,047	383,309	282,007		
9. MANAGEMENT AND SUPPORT		918	2,075	2,993	50,974	78,479	129,453			
10. UNASSIGNABLE INDIRECT COSTS (Contractual Fee)		-	-	-	-	48,913	48,913			
11. TOTAL		13,146	13,099	26,244	419,562	907,839	1,327,201	536,492		

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TABLE A-3. FINANCIAL STATISTICS (FIVE-YEAR TOTALS)

INFORMATION ANALYSIS CENTER CONTRACT STATUS REPORT	AREA TITLE	NAME OF INFORMATION ANALYSIS CENTER METALS AND CERAMICS INFORMATION CENTER	QUARTER ENDING APRIL 30, 1983				CUMULATIVE THRU MAY 1978 - APRIL 1983			
			COSTS INCURRED				INCOME			
			OUTPUT UNITS PRODUCED	PRO- FESSIONAL	NON-PRO- FESSIONAL	TOTAL	DIRECT	INDIRECT	TOTAL	
1.	ACQUISITION AND INPUT OF SOURCE INFORMATION			16,077	27,403	43,480	455,313	660,767	1,116,081	
2.	DOCUMENTS ACQUIRED	19,695								
3.	DOCUMENTS REVIEWED	19,695								
4.	DOCUMENTS CATALOGED	1,165	6,028							
5.	TECHNICAL INQUIRY RESPONSES PROVIDED	1,165	6,028	2,568	8,596	142,776	191,162	333,939	(a)	
6.	BIBLIOGRAPHIC INQUIRY RESPONSES PROVIDED	361	-	-	-	-	-	-	-	(a)
7.	HANDBOOKS/DATA BOOKS COMPLETED		5,527	3,530	9,057	101,465	281,276	392,744	(a)	
8.	NEW CHAPTERS/PAGES COMPLETED	46/2,629								
9.	REVISED CHAPTERS/PAGES COMPLETED	8/508								
10.	DATA SETS COMPILED	-								
11.	STATE-OF-THE-ART STUDIES COMPLETED	9	5,607	3,960	9,557	115,553	268,163	384,716	(a)	
12.	CRITICAL REVIEWS AND/OR TECHNOLOGY ASSESSMENTS COMPLETED	-	-	-	-	-	-	-	-	
13.	CURRENT AWARENESS AND PROMOTION EFFORTS		11,468	19,383	30,851	368,543	760,563	1,129,113	701,115 (a)	
14.	NUMBER NEWSLETTERS AND OR ANNOUNCEMENTS PUBLISHED	106/122								
15.	NUMBER MEETINGS/ CONFERENCES ETC SUPPORTED	124								
16.	OTHER (Special Tasks)	28	28,637	10,987	39,624	532,056	1,530,050	2,062,107	2,279,084 (b)	
17.	MANAGEMENT AND SUPPORT		7,841	11,407	19,248	288,061	412,536	700,597		
18.	UNASSIGNABLE INDIRECT COSTS (Contractual Fee)		-	-	-	-	-	267,646	267,645	
19.	TOTAL		81,186	79,228	160,413	2,003,767	4,383,163	6,386,941	2,980,199	

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(a) Total NTIS plus MCIC Direct Income Listed Line 7 (see Table 13).

(b) Special Task MIPR plus Direct Income (see Table 13).

APPENDIX B

TECHNICAL PERSONNEL ASSOCIATED WITH
MCIC PRODUCTS AND SERVICES

(Twentieth Quarter)

APPENDIX B

TECHNICAL PERSONNEL ASSOCIATED WITH
MCIC PRODUCTS AND SERVICES

(Twentieth Quarter)

<u>Personnel</u>	<u>Area of Specialization</u>
	<u>Inquiries</u>
Bartlett, E.	High Temperature Metals
Buchheit, R.	Physical Metallurgy
Clauer, A.	HIP
Fletcher, E.	HSLA Steels
Gurklis, J.	Surface Finishing
Hauth, W.	Ceramics
Hucek, H.	Information/Inquiry Handling
Jelinek, F.	Inquiry Manager
Johnson, D.	Information Handling
McCoy, L.	Ceramics
Mindlin, H.	Mechanical Properties
Pestel, H.	Information Handling
Roach, D.	Physical Metallurgy
Stephan, P.	Glass and Ceramics
Whitacre, G.	Thermal Energy
Williams, D.	Light Metals

<u>Personnel</u>	<u>Area of Specialization</u>
<u>Current Awareness Bulletin</u>	
Bartlett, E.	High Temperature Metals
Berry, W.	Corrosion
Clauer, A.	HIP
Cordaro, J.	Glass
Duga, J.	Fracture
Gurklis, J.	Surface Finishing
Jelinek, F.	CAB Editor
Pattee, H.	Welding
Sekercioglu, I.	Ceramics
Williams, D.	Light Metals
<u>Technical Reports</u>	
Tucker, T.	Process Metallurgy
Clauer, A.	Process Metallurgy
Meiners, K.	Process Metallurgy
Boyer, C.	Process Metallurgy
Semiatin, S.	Metalworking
Altan, T.	Metalworking
Wills, R.	Ceramic Application
Brockway, C.	Ceramic Application

<u>Personnel</u>	<u>Area of Specialization</u>
<u>Handbooks/Databooks</u>	
Hucek, H.	Mechanical Properties and Physical Metallurgy of Ferrous Metals
Morral, F.	Mechanical Properties of Metals
Williams, D.	Light Metals
Wood, R. (Consultant)	Titanium
Lula, R. (Consultant)	Properties of Steels
Brown, W. (Consultant)	Properties of Metals
Kattus, J. (Consultant)	Properties of Metals
Brown, K. (Consultant)	Properties of Aluminum Alloys
Manson, S. (Consultant)	Properties of Metals
<u>Special Task Management</u>	
Mindlin, H.	MCIC Manager
<u>ManTech Journal</u>	
Spalsbury, W.	Production Editor
<u>C-C Database</u>	
Jelinek, F.	Data Review
Gubiotti, R.	Data Handling
<u>Conferences</u>	
Mindlin, H.	Conference Coordination
Armstrong, S.	Conference Arrangements

<u>Personnel</u>	<u>Area of Specialization</u>
<u>Welding - Marine Propellers</u>	
Mischler, H.	Welding
Pattee, H.	Welding
<u>MIL-STD-1515</u>	
Deel, O.	Fastener Specialist
Hopper, A.	Section Manager
<u>Technical Assistance - Welding</u>	
Pattee, H.	Welding
Mischler, H.	Welding
<u>HSLA Steels</u>	
Fletcher, E.	Ferrous Metallurgy
<u>Foreign Ship Hull Technology</u>	
Mischler, H.	Welding
Roach, D.	Ferrous Metallurgy

APPENDIX C

ORGANIZATIONS SERVED BY MCIC

(Twentieth Quarter)

APPENDIX C

TABLE C-1. ORGANIZATIONS SERVED BY MCIC

Inquiry Number	Organization and Person	Biblio- graphic	Service Charge	No Charge
	<u>Industrial</u>			
2657	A. Newberry Control Data Corporation Oklahoma City, OK	X		X
2658	A. Murray Central Steel and Wire Chicago, IL			X
2659	D. Hauser Battelle Columbus Labs. Columbus, OH	X	X	
2660	N. Volny Volny Engineering			X
2661	W. Berry Battelle Columbus Labs. Columbus, OH	X	X	
2662	M. Manahan Battelle Columbus Labs. Columbus, OH	X	X	
2663	J. Pan Battelle Columbus Labs. Columbus, OH			X
2664	W. Coutts Wyman Gordon North Grafton, MA		X	
2666	T. Cookson Williams International Walled Lake, MI	X	X	
2667	D. Brown Crescent Xcelite Sumter, SC			X

TABLE C-1. (Continued)

Inquiry Number	Organization and Person	Biblio- graphic	Service Charge	No Charge
<u>Industrial (Continued)</u>				
2668	J. Babbit Sectional Die Co. Wellington, OH			X
2670	D. Crawmer Battelle Columbus Labs. Columbus, OH	X		X
2671	M. Kangilaski General Electric Cincinnati, OH	X	X	
2672	G. Lundeen Marquardt		X	
2673	D. McIntyre Battelle Houston Houston, TX	X	X	
2674	D. Williams Battelle Columbus Labs. Columbus, OH	X		X
2675	L. Gibson Buffalo Forge Buffalo, NY			X
2677	M. Everson ONA Company			X
2678	R. Snedeker Aeronautical Research Association Princeton, NJ			X
2679	J. Phillips Boeing Co. Seattle, WA			X
2681	D. Burmaster Industrial Economics Cambridge, MA			X

TABLE C-1. (Continued)

Inquiry Number	Organization and Person	Biblio- graphic	Service Charge	No Charge
<u>Industrial (Continued)</u>				
2682	S. Peltier Detroit Diesel Allison Indianapolis, IN	X	X	
2683	K. Coughlin Combustion Engineering	X		X
2684	S. Clark Ford Aerospace			X
2685	D. Goodwin Technomics, Inc.			X
2687	R. E. Thompson Ballistic Research Lab			X
2688	R. Dearth General Electric Co. Cincinnati, OH			X
2691	P. Ruff Battelle Columbus Labs. Columbus, OH	X		X
2692	D. Pierce Varian Grove City, OH			X
2694	E. Stankiewicz Kennecott			X
2695	R. Kraft Spraying Systems, Inc. Wheaton, IL		X	
2698	J. Vickinick Detroit Diesel Allison Indianapolis, IN			X

TABLE C-1. (Continued)

Inquiry Number	Organization and Person	Biblio- graphic	Service Charge	No Charge
<u>Industrial (Continued)</u>				
2700	S. Winters Detroit Diesel Allison Indianapolis, IN		X	
2701	H. Gordon Premium Glass Co. Hilliard, OH			X
2702	M. Jirinec Eaton Corporation Long Island, NY			X
2703	M. Caldwell Dan Ellis Ind. Design Columbus, OH			X
2704	W. Glater Consultant			X
2706	W. Degnan Sikorsky Aircraft Stratford, CT			X
2707	R. Fawley Solar Turbines, Inc. San Diego, CA	X	X	
2708	E. Bartlett Battelle Columbus Labs. Columbus, OH	X		X
2712	R. Dorset Zimmer Corp. Warsaw, IN			X
2713	P. Ruff Battelle Columbus Labs. Columbus, OH	X		X
2714	S. Diamond Battelle Columbus Labs Columbus, OH	X		X

TABLE C-1. (Continued)

Inquiry Number	Organization and Person	Biblio- graphic	Service Charge	No Charge
<u>Industrial (Continued)</u>				
2715	R. Fawley Solar Turbines, Inc. San Diego, CA	X	X	
2717	M. McCann Fan Steel Cleveland, OH	X		X
2718	D. Kenyon Spaulding Corp. Waltham, MA			X
2719	P. Ruff Battelle Columbus Labs. Columbus, OH			X
2720	M. Adamson Raytheon Corp.			X
2721	G. Brennan Generation Metals Hauppauge, NY			X
2724	D. Kenyon Spaulding Corp. Waltham, MA			X
2726	R. Kolloff General Electric Co. Cincinnati, OH	X	X	
2727	J. Fuscoe Rohr Industries			X
2728	J. Kain Detroit Edison Detroit, MI			X
2731	F. Bauman National Referral Center			X

TABLE C-1. (Continued)

Inquiry Number	Organization and Person	Bibliographic	Service Charge	No Charge
<u>Industrial (Continued)</u>				
2732	K. Campion Raytheon Corp.			X
2733	J. Paulson Pyramid Steel			X
2735	R. Pratt Autoclave Engineers Erie, PA			X
2738	A. Newell Westinghouse Pittsburgh, PA	X	X	
2739	A. Frederick G.P.U. Nuclear Parsippany, NJ			X
2740	W. Connors Sunstrand Corp.			X
2741	W. Humy Sunstrand Aviation Rockford, IL			X
2742	S. Porembka Westinghouse Bettis West Mifflin, PA	X		X
2743	J. Osendorf Rosemount, Inc. Rosemount, MN			X
2744	D. Ohanehi Kollmorgen Corp.			X
2745	D. Hauser Battelle Columbus Labs. Columbus, OH	X	X	

TABLE C-1. (Continued)

Inquiry Number	Organization and Person	Biblio- graphic	Service Charge	No Charge
<u>Industrial (Continued)</u>				
2747	J. Quintal Martin Marietta Denver, CO			X
2748	I. Sargent Westec Services, Inc. Philadelphia, PA			X
2749	J. Synk SCM Metal Products			X
2750	M. Kieseewetter Caterpillar Peoria, IL			X
2751	J. Lawson Sunstrand Aviation Rockford, IL			X
2752	W. Humy Sunstrand Aviation Rockford, IL			
2753	C. Lungren Gamma-Metrics San Diego, CA			X
2754	M. Green Bell Helicopter Textron, Inc.	X		X
2755	D. Ridout Consultant Export, PA			X
2756	D. Williams Battelle Columbus Labs. Columbus, OH			X

TABLE C-1. (Continued)

Inquiry Number	Organization and Person	Biblio- graphic	Service Charge	No Charge
<u>Industrial (Continued)</u>				
2757	H. Henninger Roll Forming Corp.			X
2758	R. Kolloff General Electric Co. Cincinnati, OH			X
2759	S. Winters Detroit Diesel Allison Indianapolis, IN	X	X	
2760	G. Chyz GMC Saginaw, MI			X
2761	J. Trevathan Consultant Silver Spring, MD			X
2762	R. Green General Dynamics Groton, CT	X		X
2764	J. Anderson McDonnell Douglas Huntington Beach, CA			X
2765	H. Gayley Deland Trenton, NJ	X	X	
2766	D. Cottrell OCF Granville, OH			X
2768	R. Dearth General Electric Co. Cincinnati, OH			X
2770	M. Schreiner MTI Corp. Latham, NY			X

TABLE C-1. (Continued)

Inquiry Number	Organization and Person	Biblio- graphic	Service Charge	No Charge
<u>Industrial (Continued)</u>				
2771	J. Shields Lockheed California Co. Burbank, CA	X	X	
2773	M. Callahan McDonnell Douglas Huntington Beach, CA	X		X
<u>Government</u>				
2665	J. Maher Flight Research Center NASA-Dryden			X
2676	J. Rollruher NASA/Lewis Cleveland, OH	X		X
2680	R. Marshall Naval Sea Com. Sys. Norfolk, VA			X
2689	H. Burnsteel Naval Sea Systems Com. Washington, DC	X		X
2693	W. Goldenrath NASA-Ames Moffett Field, CA			X
2697	W. Goldenrath NASA-Ames Moffett Field, CA			X
2710	D. Vreeland NSRDC Annapolis, MD	X	X	
2711	J. Federer ORNL Oak Ridge, TN		X	

TABLE C-1. (Continued)

Inquiry Number	Organization and Person	Biblio- graphic	Service Charge	No Charge
<u>Government (Continued)</u>				
2722	J. Lappin NSRDC Bethesda, MD			X
2723	G. Legate LASL Los Alamos, NM			X
2725	J. Gustafiero Dept. of Commerce Washington, DC			X
2734	M. Levins NASA Space Flight Center Green Belt, MD			X
2736	J. Wagner Robbins AFB Warner Robbins, GA	X		X
2763	W. Goldenrath NASA-Ames Moffett Field, CA	X		X
2767	H. Schafft NBS Washington, DC			X
2772	W. Brown NASA/Lewis Cleveland, OH			X
2774	B. Webb WPAFB, OH	X		X

TABLE C-1. (Continued)

Inquiry Number	Organization and Person	Biblio- graphic	Service Charge	No Charge
<u>Academic</u>				
2716	S. Quan Harvey Mudd College Clinic	X	X	
2729	J. Seik Ohio Tech. Training Org. Cincinnati, OH			X
2737	M. Jacobson University of Arizona Tempe, AZ			X
<u>Foreign</u>				
2696	Imkometal Zurick, Switzerland			X
2699	H. DeHollu Netherlands Embassy Washington, DC	X	X	
2705	L. Dumper The Welding Institute Cambridge, England	X		X
2709	M. Rocheleau Ministry of Transportation Paris, France	X		X
2746	R. Castillo Westinghouse Canada Hamilton, Ontario			X

APPENDIX D

SALES OF MCIC TECHNICAL REPORTS

PUBLICATION NUMBER	DATE	D O C U M E N T	T I T L E	NUMBER SOLD (NTIS)	NUMBER SOLD (NCIC)	NUMBER SOLD (TOTAL)	NUMBER SOLD (CUMUL)
7101	AUG71	EFF OF SURF COND ON MECH PROP TITANIOIDS		1	0	1	1,010
7102	DEC71	EFF SHOT PEEN ON IMP. FAT-STR CORR PROP		6	4	10	1,222
7203	JAN72	NONTRADITIONAL MACHINING OF BERYLLIUM		1	0	1	256
7204	JAN72	CRACK BEHAVIOR IN DGAC STEEL		0	0	0	415
7205	JAN72	SYMP ON PROP OF ELECT DEP METALS		0	0	0	923
7206	MAR72	IMPURITY EFFECTS IN BERYLLIUM		0	0	0	151
7207	JUN72	OXIDATION OF FE-NI + COBALT BASE ALLOYS		0	5	5	627
7208	JUN72	HOT CORROSION IN GAS TURBINES		0	5	5	686
7209	JUL72	REBILIO ON FIBERS + COMP MATLS 1969-72		0	2	2	691
7210	SEP72	SUPERALLOYS-PROCESSING (CONF PROC.)		2	2	4	644
7211	SEP72	BETA TITANIUM ALLOYS		0	0	0	361
7212	DEC72	FRAC ANAL BY SCANNING ELEC MICRO(OBS)		0	0	0	1,520
7313	JAN73	ADV IN JOINING TECH - 80'S + BEYOND(OBS)		0	0	0	791
7314	JAN73	MATLS FOR USE IN AIRCRAFT GAS TURB ENG		1	0	1	707
7315	AUG73	METALLURGY OF FUSION-WELD REPAIR		0	1	1	683
7316	DEC73	TITANIUM CASTING TODAY		0	0	0	320
7319	DEC73	PROC 72 TRI-SERV CONF ON CORROSION		1	0	1	378
7417	APR74	PROC 73 SYMP ELEC-DEP METAL SEL APP		0	1	1	408
7418	FEB74	METAL IMPLANT FOR ORTHO-DENT SURG(CBS)		0	0	0	477
7420	JUN74	PROPERTIES OF TEXTURED TITANIUM ALLOYS		0	0	0	258
7421	JUL74	CERA PROSTH APPL-OPTHO DEM+CARDIO(OBS)		0	1	1	246
7422	JUL74	NONDESTRUCTIVE TESTING OF BERYLLIUM		1	0	1	104
7423	AUG74	CORROSION OF METALS IN THE ATMOSPHERE		0	2	2	625
7424	OCT74	AUTOMATION IN WELDING (OBSOLETE)		0	0	0	285
7525	MAR75	CRACKS AT STRUCTURAL HOLES		0	0	0	277
7526	JUN75	TITANIUM INDUSTRY IN THE MID 70'S		0	1	1	367
7527	JUL75	PROC 74 GAS TURB MATLS N MAR ENVIRO CONF		1	1	2	306
7628	SEP76	PROC + APPLI OF DEPL URAN ALLOY PROD		2	2	4	135
7729	MAR77	ANNOI BIBLI SIL MIT FOR STRUC APPLI(OBS)		0	0	0	191
7730	APR77	DISPERSION STRENGTHENING OF METALS		1	1	2	303
7731	MAY77	LOW TEMP PROP SEL MATLS-BIBLIC W/DESCR		0	0	0	189
7732	JUN77	EFF RAP HEAT PROP MATLS-BIBLIC W/DESCR		0	0	0	282
7733	DEC77	PROC 76 TRI-SERV CONF ON CORROSION		1	1	2	210
7734	NOV77	HOT ISOSTATIC PROCESSING		1	2	3	1,176
7835	JAN78	RHEOCASTING		1	0	1	262
7836	MAR78	PROC DARPA/NAVSEA CER CASTURB DEM		2	0	2	508
7837	MAR78	CORROSION OF METALS IN MARINE ENVIRO		2	4	6	916
7838	NOV78	BIBLIO ON FIBERS + COMPOSITE MATLS		0	3	3	321
7939	APR79	REVIEW METALL MI-STREN LOW-ALLOY STEEL		0	4	4	413
7940	JUL79	TRI-SERV CORROSION CONF-78		1	3	4	218
7941	JUL79	SILICON NITRIDE BIB		1	0	1	216
8142	JUL81	CORR FATIGUE OF METALS IN MAR ENV		0	29	37	340
8143	OCT81	TECHNOLO. ADVAN. IN MATLS JOINING		5	10	15	191
8145	OCT81	RAPID SOLIDIFICATION TECHNOLOGY		0	6	6	230
8246		HOT ISOSTATIC PROCESSING		0	168	168	168
MISC8P				0	0	0	3
T O T A L				39	258	297	20,925

TABLE D-1. TWENTIETH QUARTER - STATE-OF-THE-ART REPORT SALES

PUBLICATION NUMBER	DATE	D O C U M E N T	T I T L E	NUMBER SOLD (NTIS)	NUMBER SOLD (NCIC)	NUMBER SOLD (TOTAL)	NUMBER SOLD (CUMUL)
BPWISC				0	0	0	3
HB01	DEC72		DAMAGE TOLERANT DESIGN HANDBOOK	0	18	18	1,419
HB01S1	DEC73		1ST SUPP TO D-T-D HANDBOOK	0	18	18	946
HB01S2	JAN75		2ND SUPP TO D-T-D HANDBOOK	0	18	18	847
HB02	DEC72		TITANIUM ALLOYS HANDBOOK	1	10	11	1,232
HB03	OCT73		FORGING--EQUIP, MATLS, + PRACTICES	17	12	29	1,915
HB04	NOV74		HBOK ON MATLS FOR SUPERCONDUCTING MACH.	0	4	4	448
HB04S1	NOV75		1ST SUPP TO HBOK ON M-S-M	1	4	5	318
HB04S2	JAN77		2ND SUPP TO HBOK ON M-S-M	1	4	6	281
HB05	OCT80		SOVIET ALLOY HANDBOOK -- 1980 ED	2	29	31	887
HB05S1	APR76		1ST SUPP TO SOVIET ALLOY HBOK(OBS)	0	0	0	306
HB06	DEC75		SEN/TEM FRACTOGRAPHY HANDBOOK	0	7	7	998
HB07V1	MAR76		ENGRG PROP DATA ON CERAMICS-V1 NITRIDES	1	98	99	867
HB07V2	AUG79		ENGRG PROP DATA ON CERAMICS-V2 CARBIDES	1	86	87	572
HB07V3	JUL81		ENGRG PROP DATA ON CERAMICS-V3 SGLCIXID	0	93	93	504
HB08	JUN76		ELECTRON FRACTOGRAPHY HANDBOOK	0	2	2	470
HB09V1	NOV76		HBOK OF INTNL ALLOY COMP+DESIG.-V1 TI	0	6	6	497
HB09V2	DEC78		HBOK INTNL AL. COMP+DES- V2 SUPERALLOY	0	5	5	458
HB09V3	OCT80		HBOK INTNL AL. COMP+DES- V3 ALUMINUM	0	15	15	491
T O T A L				24	430	454	13,459

TABLE D-2. TWENTIETH QUARTER - HANDBOOK SALES

PUBLICATION NUMBER	DATE	D O C U M E N T	T I T L E	NUMBER SOLD (INTS)	NUMBER SOLD (MCIS)	NUMBER SOLD (TOTAL)	NUMBER SOLD (CUMUL)
700079		ALLOY CROSS INDEX(1979)		0	0	0	25
700080		ALLOY CROSS INDEX(1980)		0	0	0	31
700081		ALLOY CROSS INDEX(1981)		0	0	0	120
800079		STRUCTURAL ALLOYS HANDBOOK(1979)		0	0	0	45
800080		STRUCTURAL ALLOYS HANDBOOK(1980)		0	0	0	60
800081		STRUCTURAL ALLOYS HANDBOOK(1981)		0	0	0	58
800082		STRUCTURAL ALLOYS HANDBOOK(1982)		0	1	1	67
800083		SAH(1979 SUPPLEMENT)		0	20	20	20
810079		SAH(1980 SUPPLEMENT)		0	0	0	294
810080		SAH(1981 SUPPLEMENT)		0	0	0	652
810081		SAH(1982 SUPPLEMENT)		0	9	9	252
810082		SAH(1983 SUPPLEMENT)		0	37	37	221
810083		MISCELLANEOUS		0	0	0	112
900000		ASMHC(1979)		0	0	0	25
900079		ASMHC(1980)		0	0	0	57
900080		ASMHC(1981)		0	0	0	84
900081		ASMHC(1982)		0	0	0	85
900082		ASMHC(1978 SUPPLEMENT)		0	42	42	91
900083		ASMHC(1979 SUPPLEMENT)		0	0	0	42
910079		ASMHC(1980 SUPPLEMENT)		0	2	2	1
910080		ASMHC(1981 SUPPLEMENT)		0	3	3	678
910081		ASMHC(1982 SUPPLEMENT)		0	4	4	1,179
910082		ASMHC(1983 SUPPLEMENT)		0	8	8	580
910083		ASMHC(1983 SUPPLEMENT)		0	75	75	475
T O T A L				0	203	203	5,594

(N O T E) : SAH --- STRUCTURAL ALLOYS HANDBOOK

ASMHC --- AEROSPACE STRUCTURAL METALS HANDBOOK

TABLE D-3. TWENTIETH QUARTER - ASMHC AND SAH SALES

PUBLICATION NUMBER	DATE	D O C U M E N T	T I T L E	NUMBER SOLD (NTIS)	NUMBER SOLD (MCIC)	NUMBER SOLD (TOTAL)	NUMBER SOLD (CUMUL)
AMTC 1	OCT72	AMPC BKS - SOLID TECH		0	1	1	118
AMTC 2	NOV73	AMRC BKS - CERAMICS FOR HI PERF APPL I		0	1	1	109
AMTC 3	FEB74	AMRC BKS - PHY MET URAN ALLOYS		0	5	5	53
AMTC 4	SEP75	AMRC BOOKS - AMTC NO 4 - JOINING		0	0	0	348
AMTC 5	MAR77	AMRC BKS - CERAMICS FOR HI PERF APPL II		0	4	4	229
CBD		CONVERSE BUSINESS DAILY		0	0	0	1
FILM		SCANNING ELECTRON MICROSCOPY		0	1	1	2
HELPG2	JUL76	SURV ON MECH PROP ON RAPID HEATING		0	1	1	8
HELPG3	FEB78	SURV ON MECH PROP ON RAPID HEAT WDR		0	0	0	17
HTC 78	FEB78	1978 MATERIALS TECHNOLOGY REPORT		0	0	0	12
SPEC	JUL79	MISC REPORTS		0	0	0	251
SR7501	FEB75	MATERIALS SHORTAGE WORKSHOP PROCEEDINGS		0	0	0	117
SR7502	JUL75	BERILLIUM-UTILIZATION/AVAILABILITY		0	0	0	153
SR7606	MAR76	WORKSHOP ON GOVT POLICIES + PROGRAMS		0	0	0	1
STC 76	NOV76	1976 STRUCTURES TECHNOLOGY REPORT		0	0	0	288
T O T A L				0	13	13	2,059

(N O T E) : NTIS DOES NOT SELL THESE DOCUMENTS.

TABLE D-4. TWENTIETH QUARTER - MISCELLANEOUS SALES

PUBLICATION NUMBER	DATE	D O C U M E N T	T I T L E	MUMRFR SOLD (HTIS)	MUMRFR SOLD (MCIC)	MUMRFR SOLD (TOTAL)	NUMBER SOLD (CUMUL)
7101	AUG71	EFF OF SURF COND ON MECH PROP	11-ALLOYS	3	5	8	1,018
7102	DEC71	EFF SHOT PEEN ON IMP. FAT+STR CORR PROP		8	21	29	1,222
7203	JAN72	NONTRADITIONAL MACHINING OF BERYLLIUM		2	2	4	256
7204	JAN72	CRACK BEHAVIOR IN DEAC STEEL		2	2	4	415
7205	JAN72	SYMP ON PROP OF ELECT DEP METALS		1	3	4	923
7206	MAR72	PURIFY EFFECTS IN BERYLLIUM		0	0	0	151
7207	JUN72	OXIDATION OF FE-NI + COBALT BASE ALLOYS		0	13	13	627
7208	JUN72	HOT CORROSION IN GAS TURBINES		3	10	13	686
7209	JUL72	BIBLIO ON FIBERS + COMP MATLS 1969-72		4	5	9	641
7210	SEP72	SUPERALLOYS-PROCESSING (CONF PROC.)		2	5	7	644
7211	SEP72	BETA TITANIUM ALLOYS		1	0	1	361
7212	DEC72	FRAC ANAL BY SCANNING ELEC MICROSCOPES		0	0	0	1,526
7313	JAN73	ADV IN JOINING TECH - 60°S + BERYLLIUM(OBS)		0	0	0	791
7314	JUN73	MATLS FOR USE IN AIRCRAFT GAS TURB ENG		3	3	6	707
7315	AUG73	METALLURGY OF FUSION-WELD REPAIR		1	5	6	643
7316	DEC73	TITANIUM CASTING TODAY		1	4	5	320
7317	DEC73	PROC 72 TRI-SERV CONF ON CORROSION		5	2	7	376
7417	APR74	PROC 73 SYMP ELEC-DEP METAL SEL APPLI		0	3	3	408
7418	FEB74	METAL IMPLANT FOR ORTHO+DENT SURG(OBS)		0	0	0	477
7420	JUN74	PROPERTIES OF TEXTURED TITANIUM ALLOYS		1	1	2	258
7421	JUL74	CERA PROSTH APPL-ORTHO DENT+CARDIO(OBS)		0	1	1	249
7422	JUL74	NONDESTRUCTIVE TESTING OF BERYLLIUM		1	0	1	104
7423	AUG74	CORROSION OF METALS IN THE ATMOSPHERE		7	11	18	625
7424	OCT74	AUTOMATION IN WELDING (OBSOLETE)		0	0	0	285
7525	MAR75	CRACKS AT STRUCTURAL HOLES		1	0	1	277
7526	JUN75	TITANIUM INDUSTRY IN THE MID 70'S		0	6	6	367
7527	JUL75	PROC 74 GAS TURB MATLS W MAR ENVIR CONF		2	4	6	306
7628	SEP76	PROC + APPLI OF DEPL URAN ALLOY PROD		10	7	17	135
7729	MAR77	ANNOB BILLY SIL NIT FOR STRUC APPLI(OBS)		0	0	0	191
7730	APR77	DISPERION STRENGTHENING OF METALS		1	10	11	303
7731	MAY77	LOW TEMP PROP SEL MATLS-BIBLIO W/DESCR		1	3	4	169
7732	JUN77	EFF RAP HEAT PROP MATLS-BIBLIO W/DESCR		1	7	8	262
7733	DEC77	PROC 76 TRI-SERV CONF ON CORROSION		3	5	8	210
7734	NOV77	HOT ISOSTATIC PROCESSING		2	36	38	1,177
7835	JAN78	RHEOCASTING		4	8	12	262
7836	MAR78	PROC DARPA/NAVSEA CER CASTURB DEN		3	9	12	508
7837	MAR78	CORROSION OF METALS IN MARINE ENVIRO		6	31	37	616
7838	NOV78	BIBLIO ON FIBERS + COMPOSITE MATLS		1	20	21	321
7939	APR79	REVIEW METALL HI-STREN LOW-ALLOY STEEL		1	20	21	413
7940	JUL79	TRI-SERV CORROSION CONF-78		4	11	15	218
7941	JUL79	SILICON NITRIDE R19		2	4	6	216
8142	JUL81	CORR FATIGUE OF METALS IN MAR ENV		41	107	148	342
8143	OCT81	TECHNOLOG. ADVAN. IN MATLS JOINING		45	40	85	189
8145	OCT81	RAPID SOLIDIFICATION TECHNOLOGY		0	53	53	230
8246		HOT ISOSTATIC PROCESSING		0	164	164	164
MISC8P				0	3	3	3
T O T A L				213	650	863	20,925

TABLE D-5. FIFTH YEAR - STATE-OF-THE-ART REPORT SALES

PUBLICATION	DOCUMENT	TITLE	NUMBER SOLD (NTIS)	NUMBER SOLD (MCIC)	NUMBER SOLD (TOTAL)	NUMBER SOLD (CUMUL)
NUMBER	DATE					
BP18C						
HB01	DEC72	DAMAGE TOLERANT DESIGN HANDBOOK	0	2	2	2
HB0181	DEC73	1ST SUPP TO D-T-D HANDBOOK	0	42	42	1,417
HB0182	JAN75	2ND SUPP TO D-T-D HANDBOOK	0	42	42	944
HB02	DEC72	TITANIUM ALLOYS HANDBOOK	5	44	44	845
HB03	DEC73	FORGING--EQUIP, MATLS, & PRACTICES	31	26	31	1,232
HB04	NOV74	HDBK ON MATLS FOR SUPERCONDUCTING MACH.	6	14	20	1,915
HB0481	NOV75	1ST SUPP TO HDBK ON M-S-M	1	13	14	448
HB0482	JAN77	2ND SUPP TO HDBK ON M-S-M	2	14	16	316
HB05	OCT80	SOVIET ALLOY HANDBOOK -- 1980 ED	11	35	46	281
HB0581	APR76	1ST SUPP TO SOVIET ALLOY HDBK(OBS)	0	0	0	867
HB06	DEC75	SEM/TEM FRACTOGRAPHY HANDBOOK	0	13	13	306
HB071	MAY76	ENGRC PROP DATA ON CERAMICS-V1 NITRIDES	5	159	164	998
HB072	AUG79	ENGRC PROP DATA ON CERAMICS-V2 CARBIDES	3	159	162	866
HB073	JUL81	ENGRC PROP DATA ON CERAMICS-V3 SiC/SiC	12	204	216	571
HB08	JUN76	ELECTRON FRACTOGRAPHY HANDBOOK	1	7	8	503
HB091	NOV76	HDBK OF INTNL ALLOY COMP+DESIG.-V1 TI	2	17	19	470
HB092	DEC78	HDBK INTNL AL. COMP+DES- V2 SUPERALLOY	2	16	18	497
HB093	OCT80	HDBK INTNL AL. COMP+DES- V3 ALUMINUM	4	86	90	458
415C-F			0	3	3	490
T O T A L			85	983	1,068	13,449

TABLE D-6. FIFTH YEAR - HANDBOOK SALES

PUBLICATION NUMBER	DATE	D O C U M E N T	T I T L E	NUMBER SOLD (RTIS)	NUMBER SOLD (MCIC)	NUMBER SOLD (TOTAL)	NUMBER SOLD (CUMUL)
700079		ALLOY CROSS INDEX(1979)		0	0	0	25
700080		ALLOY CROSS INDEX(1980)		0	0	0	31
700081		ALLOY CROSS INDEX(1981)		0	0	0	120
800079		STRUCTURAL ALLOYS HANDBOOK(1979)		0	0	0	45
800080		STRUCTURAL ALLOYS HANDBOOK(1980)		0	0	0	60
800081		STRUCTURAL ALLOYS HANDBOOK(1981)		0	0	1	56
800082		STRUCTURAL ALLOYS HANDBOOK(1982)		0	48	48	65
800083		SAH(1979 SUPPLEMENT)		0	21	21	21
810079		SAH(1980 SUPPLEMENT)		0	0	0	294
810080		SAH(1981 SUPPLEMENT)		0	6	6	653
810081		SAH(1982 SUPPLEMENT)		0	4	4	253
810082		SAH(1983 SUPPLEMENT)		0	54	58	234
900000		MISCELLANEOUS		0	181	181	182
900079		ASMHC(1979)		0	5	5	49
900080		ASMHC(1980)		0	0	0	57
900081		ASMHC(1981)		0	0	0	84
900082		ASMHC(1982)		0	0	0	85
900083		ASMHC(1983 SUPPLEMENT)		0	59	59	91
910079		ASMHC(1979 SUPPLEMENT)		0	43	43	43
910080		ASMHC(1980 SUPPLEMENT)		0	1	1	1
910081		ASMHC(1981 SUPPLEMENT)		0	4	4	679
910082		ASMHC(1982 SUPPLEMENT)		0	14	10	1,182
910083		ASMHC(1983 SUPPLEMENT)		0	19	19	547
910084		ASMHC(1984 SUPPLEMENT)		0	77	77	521
910085		ASMHC(1985 SUPPLEMENT)		0	520	520	521
T O T A L				0	1,061	1,061	5,902

U.S. AIR FORCE - STRUCTURAL ALLOYS HANDBOOK

ASST. DIR. - AIRCRAFT DIVISION - AIRCRAFT DIVISION

TABLE D-7. FIFTH YEAR - ASMHC AND SAH SALES

1245-1249

PUBLICATION NUMBER DATE	D O C U M E N T	T I T L E	NUMBER SOLD (NTIS)	NUMBER SOLD (MCIC)	NUMBER SOLD (TOTAL)	NUMBER SOLD (CUMUL)
AMTC 1 OCT72	AMNRC BKS - SOLID TECH		0	0	6	118
AMTC 2 NOV73	AMNRC BKS - CERAMICS FOR HI PERF APPL I		0	15	15	109
AMTC 3 FEB74	AMNRC BKS - PHY MET URAN ALLOYS		0	8	8	53
AMTC 4 SEPT75	AMNRC BOOKS - AMTC NO 4 - JOINING		0	8	8	348
AMTC 5 MAR77	AMNRC BKS - CERAMICS FOR HI PERF APPL II		0	25	25	228
CBD	COMMERCE BUSINESS DAILY		0	1	1	2
FILM			0	8	8	6
FIG 3			0	1	1	2
HEARG2	SCANNING ELECTRON MICROSCOPY		0	0	0	17
HEARG3	SURVEY ON MECH PROP ON RAPID HEATING		0	0	0	12
FEB78	SURV ON MECH PROP ON RAPID HEAT HOBK		0	0	0	251
NTC 78	1978 MATERIALS TECHNOLOGY REPORT		0	0	0	117
SPIC	MISC REPORTS		0	0	0	153
SR7501	MATERIALS SHORTAGE WORKSHOP PROCEEDINGS		0	0	0	1
SR7502	BERYLLIUM-UTILIZATION/AVAILABILITY		0	0	0	286
SR7606	WORKSHOP ON GOVT POLICIES + PROGRAMS		0	0	0	352
STC 76	1976 STRUCTURES TECHNOLOGY REPORT		0	0	0	
T O T A L			0	72	72	2,059

Army Materials and Mechanics Research Center
Watertown, Massachusetts 02172
ANNUAL REPORT OF THE METALS
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H. Mindlin, Metals & Ceramics
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Key Words
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DoD Information Analysis
Center
Metals
Ceramics
Information retrieval

Technical Report AMMRC TR 83-40
July 1983
Contract DLA900-78-C-1715
May 1, 1982, to April 30, 1983

This report reviews the continuing operations of the Metals and Ceramics Information Center for the Twentieth Quarter and the annual period of May 1, 1982, through April 30, 1983. Activities and coverage of the Center are discussed in terms of the major work areas: Information, Operations, Products and Services, Service-Charge Program, Marketing, and Management. Future plans for the Center also are included.

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