

**ANNUAL REPORT**

for

OPERATION OF WASTEWATER TREATMENT PLANTS

ADVANCED WASTE TREATMENT

INDUSTRIAL WASTE TREATMENT

TREATMENT OF METAL WASTESTREAMS

PRETREATMENT FACILITY INSPECTION

OPERATION & MAINTENANCE OF WASTEWATER COLLECTION SYSTEMS

WATER TREATMENT PLANT OPERATION

SMALL WATER SYSTEM OPERATION & MAINTENANCE

WATER DISTRIBUTION SYSTEM OPERATION & MAINTENANCE

<u>Summary</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>	<u>Total 1972-Date</u>
Manuals Sold	41,977	48,758	49,849	327,334
Enrollments	9,622	11,943	12,358	75,102
Completions	5,067	5,896	7,761	53,006
Students dropped	528	1,014	1,350	10,356
University Credit	227	222	249	4,731
Tests Graded	47,115	53,886	68,396	

Administered and Monitored by

HORNET FOUNDATION OF CALIFORNIA STATE UNIVERSITY, SACRAMENTO

and

DEPARTMENT OF CIVIL ENGINEERING

KENNETH D. KERRI, PROGRAM DIRECTOR

for the

U. S. ENVIRONMENTAL PROTECTION AGENCY

**January 1992**

ANNUAL REPORT

for

OPERATION OF WASTEWATER TREATMENT PLANTS

ADVANCED WASTE TREATMENT

INDUSTRIAL WASTE TREATMENT

TREATMENT OF METAL WASTESTREAMS

OPERATION & MAINTENANCE OF WASTEWATER COLLECTION SYSTEMS

WATER TREATMENT PLANT OPERATION

SMALL WATER SYSTEM OPERATION & MAINTENANCE

WATER DISTRIBUTION SYSTEM OPERATION & MAINTENANCE

The purpose of this report is to provide a summary of the accomplishments of each program on an annual basis since its inception. All programs are operating on a financially self-sustaining basis.

OPERATION OF WASTEWATER TREATMENT PLANTS, (First Edition)

<u>Year</u>	<u>Manuals Sold</u>	<u>Successful Completion</u>	<u>Dropped</u>	<u>Percent Complete</u>	<u>CE-12</u>
1972	8063	571	128	82	614
1973	5747	1569	1490	51	389
1974	6523	1144	1717	40	289
1975	4543	804	655	55	164
1976	3992	676	1052	39	119
1977	3280	570	248	70	166
1978	3232	789	310	72	141
1979	3180	881	191	82	103
1980	2444	745	431	63	109
<u>1981</u>	<u>1093</u>	<u>1028</u>	<u>239</u>	<u>81</u>	<u>55</u>
TOTAL	41,100	8,777	4,124*	68	2,149

Colleges and Universities: 301

Foreign Countries: 32

\*From 1979 on only persons who actually started course and did not finish were counted as drops.

OPERATION OF WASTEWATER TREATMENT PLANTS, (SECOND EDITION)

VOLUME I

<u>Year</u>	<u>Manuals Sold</u>	<u>Successful Completion</u>	<u>Dropped</u>	<u>Percent Complete</u>	<u>CE - 12 A and B</u>
1980	1190				19
1981	3960	411	8	98	127
1982	3976	731	181	80	98
1983	2963	655	184	78	76
1984	3347	1087	171	86	66
1985	4064	862	267	76	59
1986	4534	896	155	85	82
1987	5360	828	262	76	47
1988	7591	1172	326	78	37
1989	8641	1334	142	90	113
1990	9338	1561	361	81	43
1991	10557	1891	430	82	52
<hr/>					
TOTAL	65,521	11,428	2,487	82	819

VOLUME II

1980	715				4
1981	3023	182			47
1982	3575	309	18	94	45
1983	2438	381	33	92	39
1984	2219	472	35	93	29
1985	2827	454	91	83	25
1986	3161	438	21	95	43
1987	4134	604	72	89	20
1988	6386	934	49	95	22
1989	6038	883	51	95	27
1990	6645	761	49	97	27
1991	7478	1249	89	93	47
<hr/>					
TOTAL	48,639	5,665	508	92	375

VOLUME III

<u>Year</u>	<u>Manuals Sold</u>	<u>Successful Completion</u>	<u>Dropped</u>	<u>Percent Complete</u>	<u>CE-12C</u>
1980	428				1
1981	2422	140			58
1982	1898	213	35	86	25
1983	1437	217	33	87	30
1984	1537	430	24	95	12
1985	1525	310	45	87	17
1986	2266	291	30	91	29
1987	1762	322	27	92	15
<u>1988</u>	<u>7</u>	<u>280</u>	<u>19</u>	<u>94</u>	<u>4</u>
TOTAL	13,282	2,203	213	91	191

Colleges and Universities: 280  
Foreign Countries: 28

In 1987 Volume III was revised and split into two manuals, ADVANCED WASTE TREATMENT and INDUSTRIAL WASTE TREATMENT.

ADVANCED WASTE TREATMENT

<u>Year</u>	<u>Manuals Sold</u>	<u>Successful Completion</u>	<u>Dropped</u>	<u>Percent Complete</u>	<u>CE-12E</u>
1987	960	7	0	100	0
1988	3199	340	1	100	7
1989	3291	349	12	97	12
1990	3583	531	32	94	20
1991	3298	552	58	91	21
<hr/>					
TOTAL	14,331	1,779	103	95	60

Colleges and Universities: 100  
Foreign Countries: 10

INDUSTRIAL WASTE TREATMENT

<u>Year</u>	<u>Manuals Sold</u>	<u>Successful Completion</u>	<u>Dropped</u>	<u>Percent Complete</u>	<u>CE-12F</u>
1987	941	3	0	100	0
1988	2273	132	1	100	5
1989	2502	146	14	91	6
1990	3473	268	30	90	21
1991	3119	349	39	90	26
<hr/>					
TOTAL	12,308	898	84	91	58

Colleges and Universities: 77  
Foreign Countries: 10

**TREATMENT OF METAL WASTESTREAMS**

(Formerly TREATMENT OF WASTEWATER FROM ELECTROPLATING, METAL FINISHING AND PRINTED CIRCUIT BOARD MANUFACTURING)

<u>Year</u>	<u>Manuals Sold</u>	<u>Successful Completion</u>	<u>Dropped</u>	<u>Percent Complete</u>	<u>CE-12D</u>
1986	1281	98	0	100	18
1987	1678	229	5	98	25
1988	2077	283	4	99	13
1989	2524	344	5	99	7
1990	2798	332	27	92	22
1991	2716	332	21	94	13
<hr/>					
TOTAL	13,074	1,618	62	96	98

Colleges and Universities: 77  
Foreign Countries: 19

**PRETREATMENT FACILITY INSPECTION**

<u>Year</u>	<u>Manuals Sold</u>	<u>Successful Completion</u>	<u>Dropped</u>	<u>Percent Complete</u>	<u>CE-12G</u>
1988	1355	48	0	100	0
1989	1135	310	8	97	6
1990	1216	380	76	83	11
1991	1027	237	56	81	10
<hr/>					
TOTAL	4,733	971	140	87	27

Colleges and Universities: 24  
Foreign Countries: 6

**OPERATION & MAINTENANCE OF WASTEWATER COLLECTION SYSTEMS**  
**FIRST EDITION**

<u>Year</u>	<u>Manuals Sold</u>	<u>Successful Completion</u>	<u>Dropped</u>	<u>Percent Complete</u>	<u>CE-11</u>
1976	966	3			7
1977	1093	281	8	97	77
1978	759	246	70	78	46
1979	633	179	83	68	34
1989	645	226	53	81	37
1981	680	218	37	85	46
<u>1982</u>	<u>601</u>	<u>265</u>	<u>42</u>	<u>86</u>	<u>23</u>
TOTAL	5,377	1,418	292	83	263

**SECOND EDITION**

1983	583	25	0	100	3
1984	751	97	10	91	10
1985	1103	147	16	90	13
1986	1237	157	31	84	13
1987	1108	329	90	79	9
1988	<u>0</u>	<u>121</u>	<u>33</u>	<u>79</u>	<u>4</u>
TOTAL	4,782	876	180	83	52

In 1987 the Second Edition was revised and split into two Volumes.

**THIRD EDITION**

**VOLUME I**

<u>Year</u>	<u>Manuals Sold</u>	<u>Successful Completion</u>	<u>Dropped</u>	<u>Percent Complete</u>	<u>CE-11A</u>
1987	546	2	0	100	0
1988	1803	189	0	100	3
1989	2350	177	27	87	3
1990	3100	367	47	89	15
1991	3192	490	58	89	6
TOTAL	10,991	1,225	132	90	27

**VOLUME II**

<u>Year</u>	<u>Manuals Sold</u>	<u>Successful Completion</u>	<u>Dropped</u>	<u>Percent Complete</u>	<u>CE-11B</u>
1987	338	0	0	0	0
1988	1413	65	0	100	1
1989	1545	99	5	95	3
1990	2330	171	3	98	9
1991	2401	265	9	97	9
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
TOTAL	8,027	600	17	97	22

Colleges and Universities: 100  
Foreign Countries: 20



WATER TREATMENT PLANT OPERATION

VOLUME I

<u>Year</u>	<u>Manuals Sold</u>	<u>Successful Completion</u>	<u>Dropped</u>	<u>Percent Complete</u>	<u>CE-18</u>
1983	1469	31	0	100	10
1984	2068	327	27	92	116
1985	2344	355	82	81	69
1986	2391	415	108	79	35
1987	2972	422	143	75	29
1988	3898	554	159	78	20
1989	5044	717	160	82	22
1990	5554	793	242	77	24
1991	5507	936	317	75	22
<hr/>					
TOTAL	31,247	4,550	1,238	79	347

VOLUME II

1983	183	0	0		1
1984	1331	140	0	100	9
1985	1572	133	7	95	19
1986	1467	163	21	89	6
1987	1916	211	13	94	12
1988	2301	266	23	92	9
1989	3047	365	22	94	12
1990	3298	500	29	95	10
1991	3752	541	52	91	20
<hr/>					
TOTAL	18,867	2,319	167	93	98

Colleges and Universities: 231  
Foreign Countries: 25

WATER SUPPLY SYSTEM OPERATION

<u>Year</u>	<u>Manuals Sold</u>	<u>Successful Completion</u>	<u>Dropped</u>	<u>Percent Complete</u>	<u>CE-17</u>
1983	537	0	0		3
1984	1526	140	0	100	13
1985	1957	146	22	87	39
1986	1814	148	50	75	5
1987	<u>399</u>	<u>290</u>	<u>71</u>	<u>80</u>	<u>10</u>
TOTAL	6,233	724	143	84	70

Colleges and Universities: 59

Foreign Countries: 9

In 1987 WATER SUPPLY SYSTEM OPERATION was revised and split into two manuals, SMALL WATER SYSTEM OPERATION & MAINTENANCE and WATER DISTRIBUTION SYSTEM OPERATION & MAINTENANCE.

SMALL WATER SYSTEM OPERATION & MAINTENANCE

<u>Year</u>	<u>Manuals Sold</u>	<u>Successful Completion</u>	<u>Dropped</u>	<u>Percent Complete</u>	<u>CE-19</u>
1987	2175	36	0	100	2
1988	2115	177	9	95	5
1989	2926	146	44	77	3
1990	3090	266	62	81	9
1991	2841	330	121	73	7
TOTAL	13,147	955	236	80	26

Colleges and Universities: 75

Foreign Countries: 13

**WATER DISTRIBUTION SYSTEM OPERATION & MAINTENANCE**

<u>Year</u>	<u>Manuals Sold</u>	<u>Successful Completion</u>	<u>Dropped</u>	<u>Percent Complete</u>	<u>CE-20</u>
1987	2864	42	0	100	0
1988	2812	226	12	95	9
1989	2933	197	38	84	13
1990	4332	362	56	87	11
1991	3961	589	100	85	16
<hr/>					
TOTAL	16,902	1,416	206	87	49
Colleges and Universities:			87		
Foreign Countries:			12		