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Issues:
Witness: Gregory E. Macias
Sponsoring Party: MoPSC Staff
Type of Exhibit: Direct Testimony
Case Nos.: WR-2003-0500 AND WC-2004-0168
Date Testimony Prepared: October 3, 2003

MISSOURI PUBLIC SERVICE COMMISSION

UTILITY SERVICES DIVISION

DIRECT TESTIMONY

OF

GREGORY E. MACIAS

MISSOURI-AMERICAN WATER COMPANY

CASE NOS. WR-2003-0500 AND WC-2004-0168

Jefferson City, Missouri
October 2003

BEFORE THE PUBLIC SERVICE COMMISSION

OF THE STATE OF MISSOURI

In the Matter of the General Rate Increase for Water and Sewer Service Provided by Missouri-American Water Company.	)))	Case No. WR-2003-0500
Staff of the Missouri Public Service Commission, Complainant, v. Missouri-American Water Company, Respondent.	)))))))))	Case No. WC-2004-0168

AFFIDAVIT OF GREGORY E. MACIAS

STATE OF MISSOURI)
) ss.
COUNTY OF COLE)

Gregory E. Macias, being of lawful age, on his oath states: that he has participated in the preparation of the foregoing Direct Testimony in question and answer form, consisting of 15 pages to be presented in the above case; that the answers in the foregoing Direct Testimony were given by him; that he has knowledge of the matters set forth in such answers; and that such matters are true and correct to the best of his knowledge and belief.

Gregory E. Macias

Subscribed and sworn to before me this 2nd day of October 2003.

TONI M. CHARLTON NOTARY SEAL NOTARY PUBLIC STATE OF MISSOURI

TONI M. CHARLTON
NOTARY PUBLIC STATE OF MISSOURI
COUNTY OF COLE
My Commission Expires December 28, 2004

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MISSOURI-AMERICAN WATER COMPANY

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Q. Please state your name and business address.

A. Gregory E. Macias, P.O. Box 360, Jefferson City, MO 65102.

Q. By whom are you employed and in what capacity?

A. I am employed by the Missouri Public Service Commission (PSC or Commission) as a Utility Engineering Specialist II in the Engineering and Management Services Department.

Q. Please describe your educational background.

A. I earned a Bachelor of Science degree in Civil Engineering from the University of Missouri - Columbia.

Q. Please describe your work background.

A. I began working for the Missouri Public Service Commission in September 1997 as an Engineering Specialist in the Gas Safety Department. In December 2001, I joined the Engineering and Management Services Department in my current position.

Q. Please describe your duties while employed by the Commission.

A. I am responsible for depreciation determinations of companies regulated by the Commission.

Q. Have you previously filed testimony before this Commission?

A. No.

Q. What matters will you address in your testimony?

A. I will address the Commission Staff's (Staff's) recommendation regarding depreciation rates.

Q. What knowledge, skill, experience, training or education do you have in these matters?

A. I have made on-site visits to several Missouri regulated water and sewer utilities, including the majority of the Missouri-American Water Company (MAWC or Company) properties. I have gained work related experience and training from the Engineering and Management Services department's engineering staff regarding concepts of depreciation. I have completed the NARUC Utility Rate School administered by the University of Florida and The National Association of Regulatory Utility Commissioners Water Committee. I have also completed the New Mexico State University Basic NARUC Course. I have reviewed prior Commission decisions and portions of the testimony regarding this issue in previous cases.

OVERVIEW

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to provide depreciation rates that will allow the Company to collect the original cost of capital investments over the life of its assets.

Q. What is the definition of depreciation?

A. In the opinion of the Supreme Court of the United States:

> Broadly speaking, depreciation is the loss, not restored by current maintenance, which is due to all factors causing the ultimate retirement of the property. These factors embrace wear and tear, decay,

> inadequacy and obsolescence. Annual depreciation is the loss which takes place in a year. [Source: In Re: Lindheimer v. Illinois Bell Telephone Company, 292 U.S. 151, 167 (1934).]

Simply stated, in a regulatory environment, depreciation expense is the full recovery of the original cost of utility plant assets distributed over the life of the assets.

Q. What was your assignment in this case?

A. My assignment was to develop a depreciation rate for each utility plant account that will recover the original cost of assets over their average service lives (ASL). In order to allow MAWC to recover the original cost of plant in service over the useful life of the plant in service, I determined the ASL of assets by utility plant account. Then, using the ASL, I developed a depreciation rate. When the current plant balance is multiplied by the depreciation rate, the result is an annual depreciation expense that is designed to fully recover the original capital investment over the useful life of the assets.

Q. How were you able to determine an average service life for each account?

A. To determine the ASL, I performed a statistical analysis of historical retirements, and using an empirically based model, determined the ASL of each account's assets. This work was refined and confirmed by plant tours and meetings with Company engineers and operations personnel who are directly involved with operations and maintenance.

Q. How do you develop a depreciation rate using the ASL?

A. By dividing 100 percent (or one) by the Average Service Life. The resulting percentage is a depreciation rate that is designed to provide full recovery of the original capital investment of plant in service over the useful life of the plant.

Q. How is an account's depreciation rate expected to recover the original cost of capital plant in the account?

A. Each account's depreciation rate is multiplied by the respective plant in service balance. The resulting dollar amount is the annual accrual. The sum of the annual accruals, over the course of the useful life of the assets, is designed to equal the original cost of the plant in service.

Essentially, the original cost of the plant is divided by the average service life. That portion of the original cost is collected in rates every year for as many years as the ASL at which time the original cost has been fully recovered.

Q. Has this approach to appropriating depreciation expense been used by Staff before?

A. Yes, Staff has consistently used this approach in the following cases:

Union Electric Company	GR-2000-512
Union Electric Company	EC-2002-1
Laclede Gas Company	GR-2001-621
Laclede Gas Company	GR-2002-356
St. Louis County Water	WR-2000-844
Empire District Electric Company	ER-2001-299
Empire District Electric Company	ER-2002-424
Utilicorp United, Inc.	ER-2001-672
Missouri Gas Energy Company	GR-2001-292

Q. How has Staff addressed the cost of removing assets from service at the end of their useful lives?

A. The recovery of the cost of removal and salvage is addressed in the testimony of Staff witness Edward F. Began.

DEPRECIATION DETERMINATION

Q. How did you conduct the depreciation study for this case?

A. The depreciation study consisted of three steps. Step one was the determination of the average service life for each utility plant account. The second step was

to use the ASL to develop a depreciation rate that would establish the annual accrual. Third, a theoretical reserve was calculated from the information acquired in the first two steps.

Q. Please explain the analysis that was conducted to determine the Average Service Life for each utility plant account.

A. The average service life for an account is determined by analyzing the historical record of plant additions and retirements, applying an empirically developed statistical model to the data record, and using engineering judgment and knowledge obtained in the field to confirm that the results are reasonable for the type of plant in question.

The Company provides the historical record of plant additions by year, called a vintage, and of retirements from each vintage by calendar year. From this data, a survivor plot is calculated. The survivor plot is the percentage of dollars surviving, as a function of age, for all vintages.

Next, an empirically developed statistical model known as the Iowa type curves is applied to the survivor plot. Curve-fitting calculations are used to determine which Iowa-type curve and average service life the survivor plot most closely resembles.

The Gannett Fleming Depreciation Analysis Software package was used as an engineering tool to automate the calculations, generate graphs, and format the presentation of the results.

Q. What are the Iowa type curves?

A. The Iowa curves are widely used models of the life characteristics of utility property. The system of Iowa curves is a family of curve shapes empirically derived from analysis of mortality data of 176 types of utility and industrial property. The curves were

developed at the Iowa Engineering Experiment Station at what is presently known as Iowa State University. The Iowa curves were first published in 1935 and reconfirmed in 1980.

Q. How is an account's ASL then used to develop a depreciation rate?

A. An account's depreciation rate is 100 percent divided by the account's ASL (100%/ASL). This depreciation rate is designed to provide the Company recovery of 100 percent of the original cost of an account's assets over the period of those asset's used and useful lives. The ASL of an account is the estimation of the useful life of the assets in the account and therefore becomes the period over which the original cost of assets are to be recovered.

Q. How is the depreciation rate used to establish annual depreciation expense?

A. Depreciation expense is the sum of the capital account's annual accruals. An account's annual accrual is its plant in service balance multiplied by its depreciation rate, or the original cost of assets divided by the recovery period (ASL).

Q. Why is it necessary to express depreciation as a rate as opposed to a fixed annual dollar amount?

A. Depreciation rates are necessary because the plant in service balance is dynamic, i.e. the Company is adding and retiring plant each year. Depreciation rates provide for the appropriate adjustments to the booking of the annual accrual.

Q. What is the theoretical reserve, and how is it determined?

A. The theoretical reserve is the dollar amount that would be in the depreciation reserve (book reserve) account if plant experience was identical to the selected Iowa curve and ASL, and the corresponding depreciation rate had been applied from the plant's placement to the date of the study. The theoretical reserve is calculated from historical

additions and retirements, the average service life, and the selected survivor curve. Again, the computer software was used to automate the calculations and arrive at the theoretical reserve amount for each account.

STUDY RESULTS

Q. Did you conduct and complete a depreciation study of the St. Louis district of MAWC?

A. Yes, as described above. The results of the study can be found in Schedule 1. The depreciation rates determined in this study would reduce the currently ordered annual accrual for the St. Louis district from approximately $16.5 million to approximately $10 million, a difference of approximately $6.5 million for the plant in service balance as of December 31, 2002.

Q. Are any of the accounts fully depreciated?

A. Yes. Accounts [325.10] Electric Pumping Equipment - Prior to 1946, [325.30] Electric Pumping Equipment - Boosters, [343.30] Distribution Mains - Galvanized, [392.01] Transportation Equipment - Autos, [394.10] Shop and Garage Equipment, [395.10] Laboratory Furniture and [399.00] Other Tangible Property have accrued their original cost and their depreciation rates have been set to zero.

Q. How does the theoretical reserve compare to the book reserve?

A. For the St. Louis district, the book reserve is greater than the theoretical reserve by approximately $72.5 million. This over accrual can be handled in one of two ways: 1) no adjustment is made at this time, and the lives and characteristics of plant in service are monitored for correlation to currently observed lives, 2) an adjustment to the

reserve is made by amortizing the over accrual over the period of the current ASL for all utility plant or 71 years.

Q. Of these two options, which does the Staff recommend?

A. The Staff is not proposing an adjustment. The Staff believes that this option is appropriate because the relationship of the book reserve to the plant balance is not excessive.

Q. Why does the depreciation reserve have an over accrual?

A. The depreciation reserve excess is a result of the Staff's proposed depreciation rates being lower than the existing rates. One reason Staff's rates are lower is because Staff's depreciation rates are based solely on the recovery of original cost. The basis for the existing depreciation rates has been influenced by factors such as investment policy and future cost of removal.

Q. Does Staff propose any other adjustments related to the level of depreciation expense?

A. The Company currently has two (2) active depreciation reserve deficiency amortizations ordered by the Commission. In light of the fact that Staff's calculations show a depreciation reserve excess, the two previously ordered reserve deficiency amortizations for the St. Louis district should be eliminated. The combined total of these amortizations is $4,848,071 per year.

Q. Did you conduct and complete a depreciation study of the Brunswick, Jefferson City, Joplin, Mexico, Parkville, St. Charles, St. Joseph and Warrensburg districts (other districts) of MAWC?

A. No. The Company has not maintained complete or accurate data for the other eight districts, and therefore it is not possible to complete a life analysis with any degree of

accuracy. Additionally, the poor condition of data MAWC did provide precluded the Staff from calculating a reliable theoretical reserve.

Q. What depreciation rates do you propose for the other eight MAWC districts?

A. I propose using the St. Louis District depreciation rates for the other MAWC districts for all accounts except [312.00] Collecting and Impounding Reservoirs, [314.00] Wells and Springs, [390.00] Structures and Improvements Shop and Garage, [390.10] Structures and Improvements Office Buildings, [391.2] Computer Hardware and [391.25] Computer Software. For accounts [312.00], [314.00], [390.00], [390.10], [391.2] and [391.25], I recommend using the Staff's standardized water plant depreciation rates. The proposed rates for the other MAWC districts are listed in Schedule 2 and Schedule 3. The Jefferson City district appears in a separate schedule because it has ordered depreciation rates that are different from the rest of the other MAWC districts.

The proposed depreciation rates would reduce the currently ordered annual accrual for all districts of MAWC except the St. Louis from approximately $7 million to approximately $4.9 million, a difference of approximately $2.1 million for the plant in service balance as of December 31, 2002.

Q. Are any of the accounts fully depreciated?

A. Yes. Accounts [303.00] Miscellaneous Intangible Plant - Other, [391.26] Miscellaneous Intangible Plant - Software and [392.30] Transportation Equipment - Other have accrued their original cost and their depreciation rates have been set to zero.

Q. Is the Staff proposing new depreciation rates for the Parkville district sewer system?

A. Yes. The proposed depreciation rates are provided in Schedule 5. The proposed depreciation rates would increase the ordered annual accrual for the Parkville district sewer system from $1,070 to $1,443, an increase of $373 for the plant in service balance as of December 31, 2002.

Q. What is the total Staff adjustment to depreciation expense for all districts of MAWC including the elimination of amortizations?

A. The Staff recommends an annual reduction to depreciation expense of approximately $13.4 million based on December 31, 2002 plant in service balances.

DATA ISSUE

Q. What data is required to conduct a depreciation study?

A. The necessary data are: dollar additions per year (vintage) per account, and dollar retirements by vintage per account per year. Having a complete file of additions and retirements allows the analyst to generate a survivor plot that can then be analyzed to determine average service life.

Additionally, an account must have substantial history and activity (additions and retirements) to generate a survivor plot that can be fitted to a specific Iowa type curve and ASL.

Data that is incomplete or erroneous is difficult to analyze because the additions and retirements may not correlate, and the data may not accurately reflect the actual life experience of the plant in service. If the errors and omissions are extensive, an analysis of the data would likely determine ASLs that would produce depreciation rates that will recover more or less than the original cost of plant in service.

Q. Why were you unable to determine unique depreciation rates for the districts of MAWC other than St. Louis?

A. The data provided by the Company was not adequate for analysis. For the Joplin, Parkville, St. Charles, St. Joseph and Warrensburg districts, there were many years of omissions of retirements. For the Jefferson City district, there were only three recent years of usable data available. Furthermore, for the Brunswick, Mexico, Parkville, St. Charles and Warrensburg districts, there was too little activity in many of the accounts to conduct a computer based statistical analysis.

In addition to these problems with the data, there were various other errors that required the Company to submit the data files for seven of the MAWC districts four different times during this case proceeding, the latest of which still contained erroneous data.

Q. Give an example of the missing data, and explain how it affects your ability to analyze those districts.

A. The files for Joplin and St. Joseph appear to have a complete record of plant additions beginning in the 1800s, but in some accounts the files are missing over 100 years of retirements to that plant. In fact, there are no retirements posted in the Joplin district file until 1983, and in the St. Joseph file until 1984 for any vintage. For example, the Joplin District Transmission and Distribution Mains (T&D Mains) account has additions in the file dating back to 1881, but there are no retirements posted until 1983. In other words, the data implies that additions of new mains were made from 1881 through 1982 without a single unit of plant being retired from any vintage until 1983.

The results from analyzing the data as submitted cannot be trusted to represent a true retirement pattern. The data implies there were no retirements made until 1983, which is not

a reasonably accurate account of what actually happened. The survivor plot for Joplin's T&D Mains fits best to an Iowa curve that has an ASL of 192 years, which is far longer than could reasonably be expected to occur.

Q. What other errors were found in the data the Company submitted?

A. The Company submitted data files with account balances that were off by as much as 548% from their book balances. Not until the Company's fourth database submission did the account balances reconcile.

Additionally, the database contains voluminous entries where the placement of a plant vintage is indicated to have occurred at sometime in the future. For example, in the St. Joseph Structures and Improvements – Water Treatment Equipment account, there are additions in 1992 of $43,228.20 of 1986 vintage plant. This apparent error cannot be corrected without knowing if these entries should have been additions of 1986 vintage plant in 1986, 1992 vintage plant, or if these entries are incorrectly coded adjustments to errors in previous entries. While the errors are not as extensive as in the first three Company databases, they still exist in the latest database provided by the Company.

Q. What actions, in addition to submitting data requests, did the Staff take in order to obtain the data required to perform a depreciation analysis?

A. The Staff made numerous contacts with the Company, both by telephone and email, to explain its data requirements.

Q. Why do you propose assigning the depreciation rates you developed for the St. Louis district to the other MAWC districts?

A. MAWC district's data as submitted cannot be analyzed to support unique depreciation rates for the other districts. Assigning "surrogate" depreciation rates that can be

expected to reasonably reflect the lives, and therefore depreciation rates, of the other district's plant is the best alternative.

The natural choice for an analogous operation is the St. Louis district, to the extent that the St. Louis district has analogous accounts. The management, engineering and purchasing of capital plant is common for all districts in many instances. These factors should bring about a trend of commonality to the ASLs of plant in each district.

For the plant accounts that are used in the operation of the other MAWC districts but are not used by the St. Louis district, engineering judgment was used to determine that the Staff's standardized depreciation rates are an appropriate "surrogate". Those accounts are [390.00] Structures and Improvements Shop and Garage, [390.10] Structures and Improvements Office Buildings, [312.00] Collecting and Impounding Reservoirs, [314.00] Wells and Springs, [391.2] Computer Hardware and [391.25] Computer Software.

Q. Why do you propose assigning the standardized depreciation rates to accounts [390.00], [390.10], [312.00], [314.00], [391.2] and [391.25]?

A. The "standardized" depreciation rates were developed by the Engineering and Management Services Department engineers from observation of plant lives at many companies, technical experience and other sources including the expertise of the MoPSC Water & Sewer Department Staff.

Q. Why are you proposing a change to the existing, ordered depreciation rates for the other MAWC districts?

A. The currently ordered depreciation rates for the other MAWC districts, excluding the Jefferson City district, are a conglomeration of depreciation rates that were ordered for the two companies that merged into MAWC in 1995. Staff does not know of a

specific life analysis associated with the depreciation rates and no explanation has been found for how the old rates were weighted into the currently ordered depreciation rates.

Q. What does the Company need to do to the data so that it can be analyzed for valid depreciation determinations in the future?

A. The Company must "clean up" the data by doing the following:

1) Develop district specific historical databases of utility plant activity (additions, retirements, etc.) for all MAWC districts, including only vintages with proven retirement histories;

2) Use the Commission approved account numbers and descriptions set forth in the 1973 Uniform System of Accounts for Class A and B Water Utilities, as revised in 1976;

3) Work with Staff to assure the maximum data histories are included in databases;

4) Submit the completed databases to the Staff in the Gannett Fleming format within twelve (12) months after the date of the Report and Order of this case, or prior to six months before the Company files another rate case, whichever date occurs first;

5) Update the databases annually on a district specific basis, and make it available to Staff upon request;

6) Submit updated databases in the Gannett Fleming format at the time of submission of any and all future rate cases.

RECOMMENDATION

Q. Please summarize the Staff's recommendations related to your testimony.

A. The Staff recommends that the Commission order:

1) The depreciation rates presented in Schedule 1 for the St. Louis district;

2) The depreciation rates presented in Schedules 2 and 3 for the Brunswick, Jefferson City, Joplin, Mexico, Parkville, St. Charles, St. Joseph and Warrensburg districts;

3) The depreciation rates presented in Schedule 5 for the Parkville district sewer system;

4) The elimination of the two depreciation reserve amortizations currently ordered for the St. Louis district;

5) The opening of a new, separate docket to address the "cleaning up" of MAWC's depreciation database as outlined previously in this testimony.

Q. Does this conclude your testimony?

A. Yes.

WR-2003-0500

MISSOURI AMERICAN WATER COMPANY

SCHEDULE 1. ST LOUIS DISTRICT DEPRECIATION RATE DETERMINATION AND CORRESPONDING ANNUAL ACCRUAL AS OF DECEMBER 31, 2002

ACCOUNT NUMBER	TITLE	ORIGINAL COST 12/31/2002	PROPOSED LIFE (YEARS)	PROPOSED IOWA CURVE	PROPOSED DEPRECIATION RATE	PROPOSED ANNUAL ACCRUAL	ORDERED DEPRECIATION RATE	ORDERED ANNUAL ACCRUAL	THEORETICAL RESERVE	BOOK RESERVE
(1)	(2)	(3)	(4)	(5)	(6)=100%/(4)	(7)=(6)X(3)	(8)	(9)=(8)X(3)	(11)	(10)
311.00	S&I - SOURCE OF SUPPLY	5,854,282.23	50	S2.5	2.00%	117,086	3.21%	187,922	1,556,376	2,139,900
316.00	SUPPLY MAINS**	5,851,777.41	57	S2.5	1.75%	102,663	2.77%**	162,094	1,793,425	2,550,113
321.10	S&I - PUMPS	4,955,696.32	120	S2	0.83%	41,297	3.52%	174,441	1,022,992	2,097,991
321.20	S&I - BOOSTERS	2,752,459.61	178	R2.5	0.56%	15,463	2.64%	72,665	216,217	655,066
323.00	OTHER POWER EQUIPMENT	279,783.10	25	SQ	4.00%	11,191	0.00%	-	53,310	5,541
325.10	ELECTRIC PUMPING EQUIPMENT - PRIOR TO 1946*	1,117,679.47	-	-	0.00%	-	0.00%	-	-	-
325.20	ELECTRIC PUMPING EQUIPMENT - 1946 & SUB	25,185,580.25	58	R1	1.72%	434,234	3.00%	755,567	5,129,739	10,652,643
325.30	ELECTRIC PUMPING EQUIPMENT - BOOSTERS*	1,418,358.04	44	R0.5	0.00%	-	4.44%	62,975	298,393	1,665,371
326.00	DIESEL PUMPING EQUIPMENT	1,578,191.84	37	L0	2.70%	42,654	0.00%	-	270,942	1,015,107
331.00	S&I - WATER TREATMENT**	38,361,477.87	90	L2.5	1.11%	426,239	3.32%**	1,273,601	7,086,465	16,961,911
332.00	WATER TREATMENT EQUIPMENT**	40,944,712.54	54	R2	1.85%	758,235	3.78%**	1,547,710	9,424,942	17,973,383
341.00	S&I - TRANSMISSION AND DISTRIBUTION	4,649,636.63	55	S1	1.82%	84,539	2.51%	116,706	1,072,736	1,960,387
341.63	S&I - RIVER CROSSING	267,357.22	10	SQ	10.00%	26,736	10.00%	26,736	213,876	207,279
342.00	DISTRIBUTION RESERVOIRS AND STANDPIPES	11,958,912.57	54	R2.5	1.85%	221,461	2.50%	298,973	3,454,430	4,630,080
343.11	TRANSMISSION MAINS - DUCTILE IRON	78,978,472.75	87	R1	1.15%	907,799	1.62%	1,279,451	7,480,072	10,546,124
343.12	TRANSMISSION MAINS - LOCK JOINT	4,206,727.21	139	R1	0.72%	30,264	1.10%	46,274	909,304	1,455,309
343.13	TRANSMISSION MAINS - CAST IRON	16,500,968.76	100	R2	1.00%	165,010	1.56%	257,415	5,571,530	8,221,976
343.21	DISTRIBUTION MAINS - CAST IRON - 1900-1928	2,185,494.47	129	S2	0.78%	16,942	2.05%	44,803	1,210,348	1,233,750
343.22	DISTRIBUTION MAINS - CAST IRON - 1929-1956	12,766,834.46	75	R3	1.33%	170,224	2.81%	358,748	7,817,557	11,911,419
343.23	DISTRIBUTION MAINS - CAST IRON - 1957 & SUB	57,183,520.35	88	R2.5	1.14%	649,813	2.81%	1,606,857	17,139,088	29,830,463
343.24	DISTRIBUTION MAINS - ASBESTOS CEMENT	1,228,654.44	120	R1.5	0.83%	10,239	2.66%	32,682	336,273	878,154
343.25	DISTRIBUTION MAINS - DUCTILE IRON - 10" & LESS	154,388,667.58	60	R2.5	1.67%	2,573,144	2.40%	3,705,328	20,230,242	22,143,464
343.26	DISTRIBUTION MAINS - DUCTILE IRON - 12"	43,747,245.69	74	R1	1.35%	591,179	2.30%	1,006,187	3,836,490	6,139,494
343.27	DISTRIBUTION MAINS - CAST IRON - 12"	12,673,008.64	121	R0.5	0.83%	104,736	1.86%	235,718	2,149,541	4,661,989
343.30	DISTRIBUTION MAINS - GALVANIZED*	52,995.46	62	L1.5	0.00%	-	2.25%	1,192	30,942	93,855

Schedule 1-1

WR-2003-0500

MISSOURI AMERICAN WATER COMPANY

SCHEDULE 1. ST LOUIS DISTRICT DEPRECIATION RATE DETERMINATION AND CORRESPONDING ANNUAL ACCRUAL AS OF DECEMBER 31, 2002

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(1)	(2)	(3)	(4)	(5)	(6)=100%/(4)	(7)=(6)X(3)	(8)	(9)=(8)X(3)	(11)	(10)
345.00	SERVICES	68,755.31	50	R3	2.00%	1,375	2.09%	1,437	40,992	62,461
346.10	METERS	15,180,930.28	41	R3	2.44%	370,267	3.14%	476,681	5,116,523	4,633,513
346.20	METERS - ARB EQUIPMENT	3,105,393.09	39	S2	2.56%	79,625	3.70%	114,900	799,591	1,634,985
347.10	METER INSTALLATIONS	2,824,046.76	113	S2	0.88%	24,992	3.69%	104,207	592,709	1,557,133
347.20	METER INSTALLATIONS - ARB EQUIPMENT	5,600,393.55	40	S4	2.50%	140,010	3.70%	207,215	1,379,693	2,817,716
348.00	FIRE HYDRANTS	31,787,551.22	74	R1	1.35%	429,562	2.15%	683,432	5,381,615	11,118,464
390.00	S&I - MISCELLANEOUS	1,372,631.27	53	R3	1.89%	25,899	2.53%	34,728	248,823	216,474
390.92	S&I - LEASEHOLD	49,435.62	40	SQ	2.50%	1,236	15.88%	7,850	9,325	8,409
390.93	S&I - LEASEHOLD - SCADA	339,727.80	10	S4	10.00%	33,973	10.00%	33,973	95,977	95,977
391.11	OFFICE FURNITURE	7,815,669.54	54	R1	1.85%	144,735	4.27%	333,729	294,803	852,975
391.12	OFFICE EQUIPMENT	4,221,994.95	23	S0	4.35%	183,565	5.43%	229,254	279,315	250,176
392.01	TRANSPORTATION EQUIPMENT - AUTOS*	543,728.38	4	L4	0.00%	-	15.71%	85,420	382,751	588,639
392.02	TRANSPORTATION EQUIPMENT - TRUCKS	5,503,010.87	8	L1.5	12.50%	687,876	9.37%	515,632	2,241,674	2,787,694
393.00	STORES EQUIPMENT	118,226.53	44	L0.5	2.27%	2,687	3.38%	3,996	23,653	(313,639)
394.10	SHOP & GARAGE EQUIPMENT*	638,786.40	37	L0.5	0.00%	-	3.86%	24,657	163,800	756,006
394.20	TOOLS	3,751,538.50	21	L0	4.76%	178,645	4.76%	178,573	615,569	1,230,599
395.10	LABORATORY FURNITURE*	319,212.58	56	L1	0.00%	-	4.17%	13,311	63,562	478,804
395.20	LABORATORY EQUIPMENT	926,761.69	31	L0	3.23%	29,896	5.85%	54,216	176,268	166,960
396.00	POWER OPERATED EQUIPMENT	610,290.44	9	L0.5	11.11%	67,810	8.30%	50,654	321,204	201,437
397.00	COMMUNICATION EQUIPMENT	904,832.35	21	L0.5	4.76%	43,087	5.58%	50,490	158,368	364,358
398.00	MISCELLANEOUS EQUIPMENT	281,099.28	31	L0.5	3.23%	9,068	3.79%	10,654	11,654	27,642
399.00	OTHER TANGIBLE PROPERTY*	36,463.94	-	-	0.00%	-	5.62%	2,049	-	45,584
	COLUMN TOTALS	615,088,975.26				9,955,453		16,471,103	116,703,099	189,213,136
							6,515,649.95			

* ACCOUNT HAS ACCRUED ITS ORIGINAL COST AND DEPRECIATION RATE HAS BEEN SET TO ZERO

** ORDERED RATE SHOWN IS A WEIGHTED COMPOSITE OF THE RATES ORDERED FOR THE ACCOUNT'S SUBACCOUNTS.

Schedule 1-2

WR-2003-0500

MISSOURI AMERICAN WATER COMPANY

SCHEDULE 2. BRUNSWICK, JOPLIN, MEXICO, PARKVILLE, ST CHARLES, ST JOSEPH AND WARRENSBURG DISTRICTS DEPRECIATION RATE DETERMINATION AND CORRESPONDING ANNUAL ACCRUAL AS OF DECEMBER 31, 2002

ACCOUNT NUMBER	TITLE	ORIGINAL COST 12/31/2002	PROPOSED LIFE (YEARS)	PROPOSED IOWA CURVE	PROPOSED DEPRECIATION RATE	PROPOSED ANNUAL ACCRUAL	ORDERED DEPRECIATION RATE	ORDERED ANNUAL ACCRUAL	† THEORETICAL RESERVE	BOOK RESERVE
(1)	(2)	(3)	(4)	(5)	(6)=100%/(4)	(7)=(6)X(3)	(8)	(9)=(8)X(3)	(11)	(10)
303.00	MISCELLANEOUS INTANGIBLE PLANT - OTHER*	2,294.00	-	-	0.00%	-	0.00%	-		306,586
311.00	S&I - SOURCE OF SUPPLY	149,813.87	50	S2.5	2.00%	2,996	3.31%	4,959		43,498
312.00	COLLECTING AND IMPOUNDING RESERVOIRS***	111,065.96	100	***	1.00%	1,111	1.85%	2,055		79,475
313.00	LAKE, RIVER AND OTHER INTAKES	58,979.57	50	S2.5	2.00%	1,180	3.11%	1,834		(646,275)
314.00	WELLS AND SPRINGS***	3,990,825.53	50	***	2.00%	79,817	2.28%	90,991		480,799
316.00	SUPPLY MAINS	10,936,028.16	57	S2.5	1.75%	191,860	1.77%	193,568		557,191
321.00	S&I - POWER AND PUMPING	6,648,260.23	120	S2	0.83%	55,402	2.26%	150,251		544,651
322.00	BOILER PLANT EQUIPMENT	347.27	-	-	0.00%	-	0.00%	-		-
323.00	POWER GENERATION EQUIPMENT	323,229.99	37	L0	2.70%	8,736	2.12%	6,852		36,092
325.00	ELECTRIC PUMPING EQUIPMENT	11,359,511.80	58	R1	1.72%	195,854	3.77%	428,254		1,912,905
331.00	S&I - WATER TREATMENT	27,855,028.25	90	L2.5	1.11%	309,500	3.27%	910,859		3,110,390
332.00	WATER TREATMENT EQUIPMENT	31,461,145.03	54	R2	1.85%	582,614	2.95%	928,104		5,428,351
332.00	MISCELLANEOUS WATER TREATMENT - OTHER	1,375,031.68	54	R2	1.85%	25,464	2.95%	40,563		76,444
341.00	S&I - TRANSMISSION AND DISTRIBUTION	1,310,727.54	55	S1	1.82%	23,831	5.56%	72,876		332,308
342.00	DISTRIBUTION RESERVOIRS & STANDPIPES	8,201,531.53	54	R2.5	1.85%	151,880	1.97%	161,570		2,120,793
343.00	MAINS - TRANSMISSION AND DISTRIBUTION**	97,345,674.20	77	-	1.30%**	1,264,230	1.51%	1,469,920		17,489,952
344.00	MAINS - FIRE**	413,649.09	77	-	1.30%**	5,372	1.46%	6,039		55,997
345.00	SERVICES	16,560,093.46	50	R3	2.00%	331,202	2.63%	435,530		4,082,460
346&347	METERS AND METER INSTALLATIONS	12,599,193.99	41	R3	2.44%	307,297	5.64%	710,595		3,683,266
348.00	FIRE HYDRANTS	8,373,079.23	74	R1	1.35%	113,150	3.06%	256,216		2,637,470
349.00	MISCELLANEOUS TRANS. & DISTR. - OTHER**	18,610.15	77	-	1.30%**	242	2.94%	547		6,965
390.00	S&I - SHOP AND GARAGE***	254,343.52	40	***	2.50%	6,359	2.57%	6,537		11,685
390.10	S&I - OFFICE BUILDINGS***	1,509,846.58	40	***	2.50%	37,746	2.57%	38,803		581,919
390.30	S&I - MISCELLANEOUS	1,225,056.22	53	R3	1.89%	23,114	2.57%	31,484		105,172

Schedule 2-1

WR-2003-0500

MISSOURI AMERICAN WATER COMPANY

SCHEDULE 2. BRUNSWICK, JOPLIN, MEXICO, PARKVILLE, ST CHARLES, ST JOSEPH AND WARRENSBURG DISTRICTS DEPRECIATION RATE DETERMINATION AND CORRESPONDING ANNUAL ACCRUAL AS OF DECEMBER 31, 2002

ACCOUNT NUMBER	TITLE	ORIGINAL COST 12/31/2002	PROPOSED LIFE (YEARS)	PROPOSED IOWA CURVE	PROPOSED DEPRECIATION RATE	PROPOSED ANNUAL ACCRUAL	ORDERED DEPRECIATION RATE	ORDERED ANNUAL ACCRUAL	† THEORETICAL RESERVE	BOOK RESERVE
(1)	(2)	(3)	(4)	(5)	(6)=100%/(4)	(7)=(6)X(3)	(8)	(9)=(8)X(3)	(11)	(10)
391.00	OFFICE FURNITURE	673,338.97	54	R1	1.85%	12,469	9.16%	61,678		549,755
391.20	COMPUTER HARDWARE***	1,136,679.41	7	***	14.29%	162,383	9.16%	104,120		421,915
391.25	COMPUTER SOFTWARE***	1,268,714.40	7	***	14.29%	181,245	9.16%	116,214		414,248
391.26	MISCELLANEOUS INTANGIBLE PLANT - SOFTWARE*	284,734.98	-	-	0.00%	-	9.16%	26,082		336,591
391.30	OTHER EQUIPMENT	236,171.07	23	S0	4.35%	10,268	9.16%	21,633		25,597
392.02	TRANSPORTATION EQUIPMENT - AUTOS	315,463.22	4	L4	25.00%	78,866	11.66%	36,783		56,209
392.11	TRANSPORTATION EQUIPMENT - LIGHT TRUCKS	1,145,553.58	8	L1.5	12.50%	143,194	11.66%	133,572		552,327
392.12	TRANSPORTATION EQUIPMENT - HEAVY TRUCKS	96,394.79	8	L1.5	12.50%	12,049	11.66%	11,240		(1,008)
392.30	TRANSPORTATION EQUIPMENT - OTHER*	64,599.06	-	-	0.00%	-	11.66%	7,532		313,428
393.00	STORES EQUIPMENT	207,997.27	44	L0.5	2.27%	4,727	0.88%	1,830		30,512
394.00	TOOLS, SHOP AND GARAGE EQUIPMENT **	1,135,336.89	23	-	4.35%**	49,362	5.16%	58,583		360,125
395.00	LABORATORY EQUIPMENT	540,063.99	31	L0	3.23%	17,421	4.42%	23,871		49,015
396.00	POWER OPERATED EQUIPMENT	525,709.41	9	L0.5	11.11%	58,412	5.07%	26,653		173,925
397.00	COMMUNICATION EQUIPMENT - NON-TELEPHONE	281,387.12	21	L0.5	4.76%	13,399	7.33%	20,626		144,295
397.20	COMMUNICATION EQUIPMENT - TELEPHONE	74,461.39	21	L0.5	4.76%	3,546	7.33%	5,458		93,062
398.00	MISCELLANEOUS EQUIPMENT	348,146.61	31	L0.5	3.23%	11,231	4.19%	14,587		68,356
399.00	OTHER TANGIBLE PROPERTY ***	885,577.82	21	***	4.76%	42,170	2.00%	17,712	-	68,189
	COLUMN TOTALS	251,341,317.83				4,519,699		6,636,581	-	46,694,635

† NO THEORETICAL BALANCE WAS CALCULATED AS DISCUSSED IN TESTIMONY

* ACCOUNT HAS ACCRUED ITS ORIGINAL COST AND DEPRECIATION RATE HAS BEEN SET TO ZERO

** PROPOSED RATE SHOWN IS A WEIGHTED COMPOSITE OF THE RATES PROPOSED FOR THE ST LOUIS DISTRICT ACCOUNT'S SUBACCOUNTS

*** ACCOUNT ASSIGNED STAFF'S STANDARDIZED DEPRECIATION RATES

Schedule 2-2

WR-2003-0500
MISSOURI AMERICAN WATER COMPANY

SCHEDULE 3. JEFFERSON CITY DISTRICT DEPRECIATION RATE DETERMINATION AND CORRESPONDING ANNUAL ACCRUAL AS OF DECEMBER 31, 2002

ACCOUNT NUMBER	TITLE	ORIGINAL COST 12/31/2002	PROPOSED LIFE (YEARS)	PROPOSED IOWA CURVE	PROPOSED DEPRECIATION RATE	PROPOSED ANNUAL ACCRUAL	ORDERED DEPRECIATION RATE	ORDERED ANNUAL ACCRUAL	† THEORETICAL RESERVE	BOOK RESERVE
(1)	(2)	(3)	(4)	(5)	(6)=100%/(4)	(7)=(6)X(3)	(8)	(9)=(8)X(3)	(11)	(10)
311.00	S&I - SOURCE OF SUPPLY	3,755	50	S2.5	2.00%	75	2.00%	75		2,416
313.00	LAKE, RIVER AND OTHER INTAKES	85,460	50	S2.5	2.00%	1,709	3.14%	2,683		28,773
321.00	S&I - POWER AND PUMPING	609,548	120	S2	0.83%	5,080	4.47%	27,247		49,354
325.00	ELECTRIC PUMPING EQUIPMENT	1,115,926	58	R1	1.72%	19,240	2.80%	31,246		279,568
331.00	S&I - WATER TREATMENT	1,923,592	90	L2.5	1.11%	21,373	2.36%	45,397		245,555
332.00	WATER TREATMENT EQUIPMENT	2,803,199	54	R2	1.85%	51,911	3.00%	84,096		997,594
341.00	S&I - TRANSMISSION AND DISTRIBUTION	39,239	55	S1	1.82%	713	2.94%	1,154		2,604
342.00	DISTRIBUTION RESERVOIRS & STANDPIPES	954,615	54	R2.5	1.85%	17,678	NONE	-		-
343.00	MAINS - TRANSMISSION AND DISTRIBUTION**	7,171,036	77	-	1.30%**	93,130	1.34%	96,092		1,257,152
345.00	SERVICES	236,876	50	R3	2.00%	4,738	NONE	-		3,433
346.00	METERS	757,901	41	R3	2.44%	18,485	3.26%	24,708		112,424
347.00	METER INSTALLATIONS	983	113	S2	0.88%	9	3.26%	32		80
348.00	FIRE HYDRANTS	936,059	74	R1	1.35%	12,649	2.13%	19,938		282,673
390.10	S&I - OFFICE BUILDINGS***	224,797	40	***	2.50%	5,620	3.51%	7,890		86,824
391.00	OFFICE FURNITURE	31,957	54	R1	1.85%	592	3.37%	1,077		89,758
391.20	COMPUTER HARDWARE***	320,403	7	***	14.29%	45,772	11.24%	36,013		-
392.02	TRANSPORTATION EQUIPMENT - AUTOS	20,483	4	L4	25.00%	5,121	7.88%	1,614		-
392.11	TRANSPORTATION EQUIPMENT - LIGHT TRUCKS	90,781	8	L1.5	12.50%	11,348	7.88%	7,154		39,884
393.00	STORES EQUIPMENT	1,524	44	L0.5	2.27%	35	5.00%	76		434
394.00	TOOLS, SHOP AND GARAGE EQUIPMENT **	131,977	23	-	4.35%**	5,738	5.23%	6,902		76,499
395.00	LABORATORY EQUIPMENT	43,364	31	L0	3.23%	1,399	4.54%	1,969		9,498
396.00	POWER OPERATED EQUIPMENT	85,052	9	L0.5	11.11%	9,450	9.75%	8,293		99,879
397.00	COMMUNICATION EQUIPMENT	61,783	21	L0.5	4.76%	2,942	5.58%	3,447		28,373
398.00	MISCELLANEOUS EQUIPMENT	40,376	31	L0.5	3.23%	1,302	4.54%	1,833	-	5,189
	COLUMN TOTALS	17,690,686.00				336,109		408,936	-	3,697,965

† NO THEORETICAL BALANCE WAS CALCULATED AS DISCUSSED IN TESTIMONY
** PROPOSED RATE SHOWN IS A WEIGHTED COMPOSITE OF THE RATES PROPOSED FOR THE ST LOUIS DISTRICT ACCOUNT'S SUBACCOUNTS
*** ACCOUNT ASSIGNED STAFF'S STANDARDIZED DEPRECIATION RATES

Schedule 3

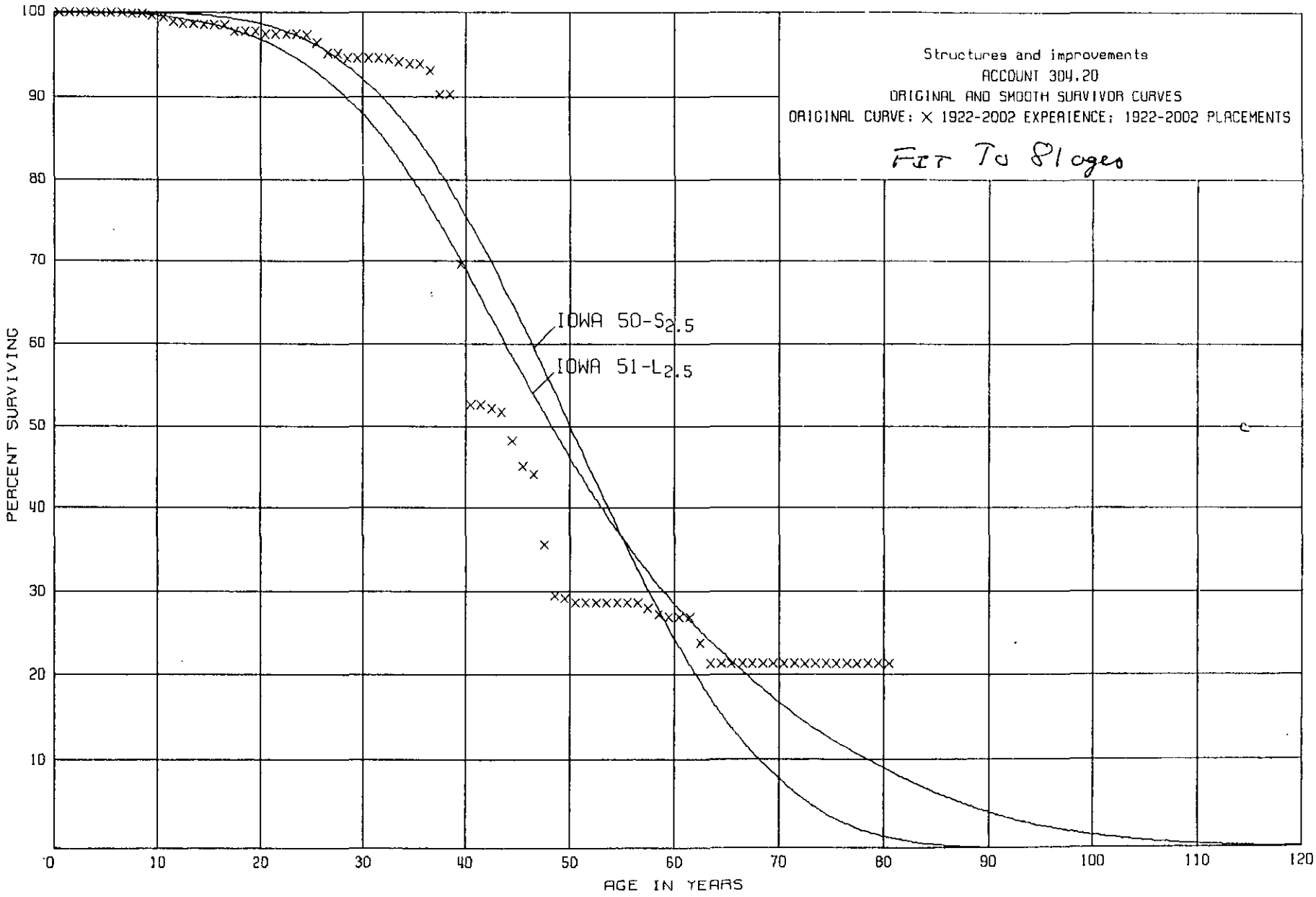
Depreciation Study
Service Life Statistics

Missouri-American Water Company –
St. Louis District

Account 311

(MAWC Account 304.20)

Structures and Improvements – Source of Supply


Structures and Improvements
ACCOUNT 304.20
ORIGINAL AND SMOOTH SURVIVOR CURVES
ORIGINAL CURVE: X 1922-2002 EXPERIENCE; 1922-2002 PLACEMENTS
Fit To 81 ages
IOWA 50-S2.5
IOWA 51-L2.5
PERCENT SURVIVING
AGE IN YEARS
100
90
80
70
60
50
40
30
20
10
0
10
20
30
40
50
60
70
80
90
100
110
120

Schedule 4-4

Structures and improvements

ACCOUNT 304.20

SUMMARY OF CURVE FITTING RESULTS - PCT SURV BALANCED AREAS

PLACEMENT BAND 1922-2002			EXPERIENCE BAND 1922-2002		
SURVIVOR CURVE	RESID MEAS	RANGE OF FIT	SURVIVOR CURVE	RESID MEAS	RANGE OF FIT*
72.9-S0	11.10	0 - 46		NOT FITTED	
64.4-S0.5	10.40	0 - 46		NOT FITTED	
57.9-S1	9.47	0 - 46		NOT FITTED	
53.7-S1.5	8.68	0 - 46		NOT FITTED	
50.3-S2	7.72	0 - 46		NOT FITTED	
48.1-S2.5	6.91	0 - 46		NOT FITTED	
46.3-S3	6.08	0 - 46		NOT FITTED	
43.5-S4	4.75	0 - 46		NOT FITTED	
42.2-S5	5.54	0 - 46		NOT FITTED	
41.7-S6	8.39	0 - 46		NOT FITTED	
97.0-R0.5	12.56	0 - 46		NOT FITTED	
78.1-R1	12.13	0 - 46		NOT FITTED	
66.0-R1.5	11.46	0 - 46		NOT FITTED	
57.2-R2	10.36	0 - 46		NOT FITTED	
51.9-R2.5	9.30	0 - 46		NOT FITTED	
48.1-R3	7.93	0 - 46		NOT FITTED	
44.3-R4	5.78	0 - 46		NOT FITTED	
42.3-R5	4.90	0 - 46		NOT FITTED	
101.4-L0	11.86	0 - 46		NOT FITTED	
85.2-L0.5	11.29	0 - 46		NOT FITTED	
73.1-L1	10.38	0 - 46		NOT FITTED	
64.6-L1.5	9.65	0 - 46		NOT FITTED	
58.2-L2	8.50	0 - 46		NOT FITTED	
53.8-L2.5	7.72	0 - 46		NOT FITTED	
50.3-L3	6.57	0 - 46		NOT FITTED	
45.4-L4	4.94	0 - 46		NOT FITTED	
43.2-L5	4.68	0 - 46		NOT FITTED	
119.3-O1	12.76	0 - 46		NOT FITTED	
134.2-O2	12.76	0 - 46		NOT FITTED	
195.3-O3	12.80	0 - 46		NOT FITTED	

* SEGMENT BETWEEN 85.0 AND 15.0 PERCENT SURVIVING.

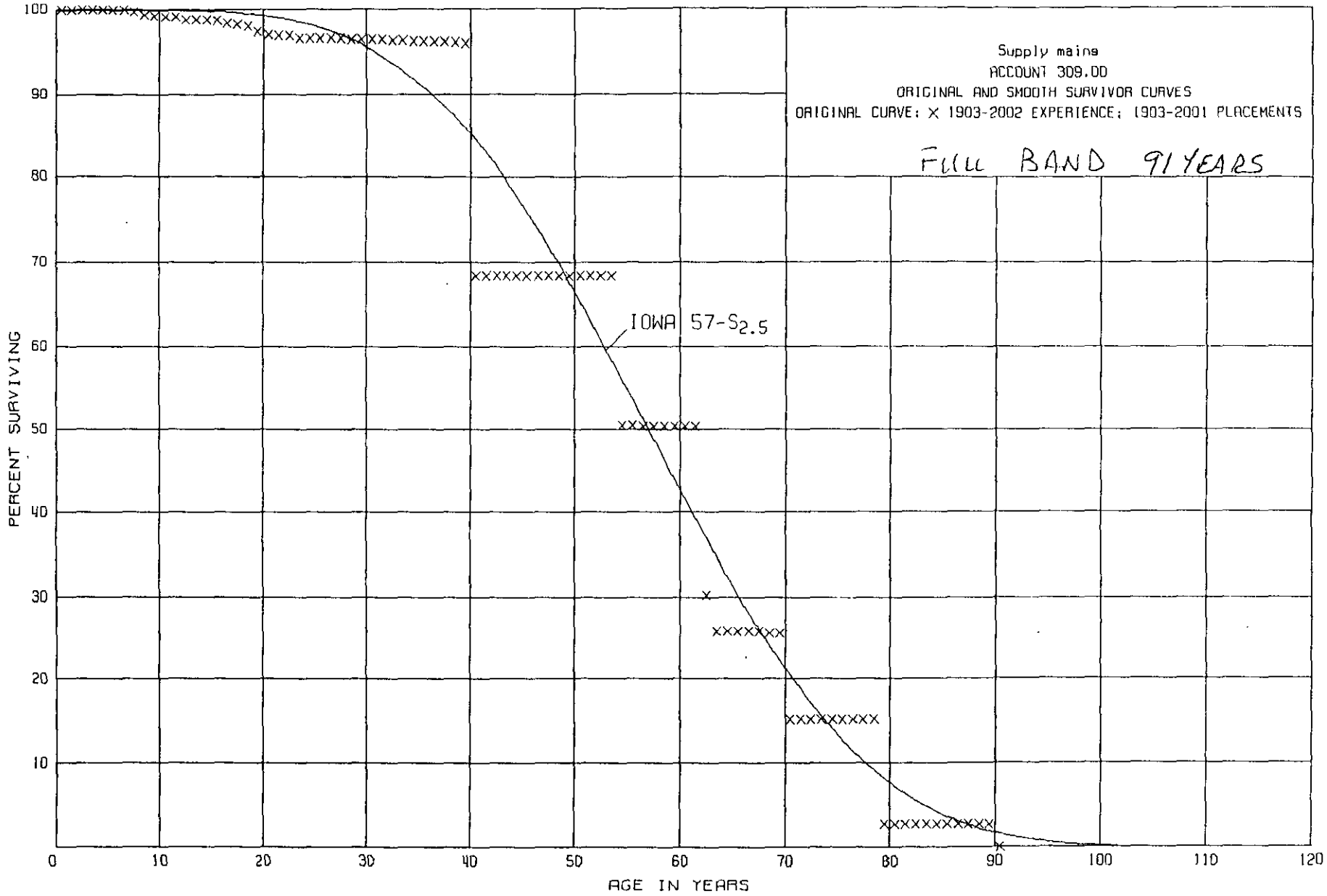
Account 316

(MAWC Account 309.00)

Supply Mains

ITEMS

- Air Chambers
- Blow-offs and Overflows
- Bridges and Culverts
- Canals
- Electrolysis Control Equipment
- Gauges and Recorders
- Jointing and Jointing Materials
- Manholes
- Meters and Meter Houses
- Municipal Inspection or Permits
- Pavement Disturbed
- Pipes, Aqueducts or Conduits
- Placing Mains and Accessories
- Pressure Regulators
- Protection of Street Openings
- Shut-offs
- Special Castings
- Sterilizing New Mains
- Surge Tanks
- Trenching
- Tunnels
- Valves and Appurtenances
- Valve Vaults


Supply mains
ACCOUNT 309.00
ORIGINAL AND SMOOTH SURVIVOR CURVES
ORIGINAL CURVE: X 1903-2002 EXPERIENCE; 1903-2001 PLACEMENTS
FULL BAND 91 YEARS
IOWA 57-S2.5
PERCENT SURVIVING
AGE IN YEARS
100
90
80
70
60
50
40
30
20
10
0
10
20
30
40
50
60
70
80
90
100
110
120

Schedule 4-8

Supply mains

ACCOUNT 309.00

SUMMARY OF CURVE FITTING RESULTS - PCT SURV BALANCED AREAS

PLACEMENT BAND 1903-2001 EXPERIENCE BAND 1903-2002

SURVIVOR CURVE	RESID MEAS	RANGE OF FIT	SURVIVOR CURVE	RESID MEAS	RANGE OF FIT*
82.2-S0	7.65	0 - 55	NOT FITTED		
73.3-S0.5	6.97	0 - 55	NOT FITTED		
66.5-S1	6.16	0 - 55	NOT FITTED		
62.0-S1.5	5.65	0 - 55	NOT FITTED		
58.4-S2	5.27	0 - 55	NOT FITTED		
56.0-S2.5	5.32	0 - 55	NOT FITTED		
54.0-S3	5.77	0 - 55	NOT FITTED		
106.2-R0.5	9.27	0 - 55	NOT FITTED		
86.6-R1	8.77	0 - 55	NOT FITTED		
74.1-R1.5	8.04	0 - 55	NOT FITTED		
65.2-R2	6.99	0 - 55	NOT FITTED		
59.7-R2.5	6.17	0 - 55	NOT FITTED		
55.7-R3	5.53	0 - 55	NOT FITTED		
51.8-R4	6.29	0 - 55	NOT FITTED		
49.9-R5	10.37	0 - 55	NOT FITTED		
112.8-L0	8.48	0 - 55	NOT FITTED		
95.8-L0.5	7.85	0 - 55	NOT FITTED		
83.1-L1	6.93	0 - 55	NOT FITTED		
74.0-L1.5	6.30	0 - 55	NOT FITTED		
67.1-L2	5.49	0 - 55	NOT FITTED		
62.4-L2.5	5.29	0 - 55	NOT FITTED		
58.6-L3	5.37	0 - 55	NOT FITTED		
53.2-L4	7.17	0 - 55	NOT FITTED		
129.8-O1	9.51	0 - 55	NOT FITTED		
145.9-O2	9.51	0 - 55	NOT FITTED		
212.0-O3	9.57	0 - 55	NOT FITTED		

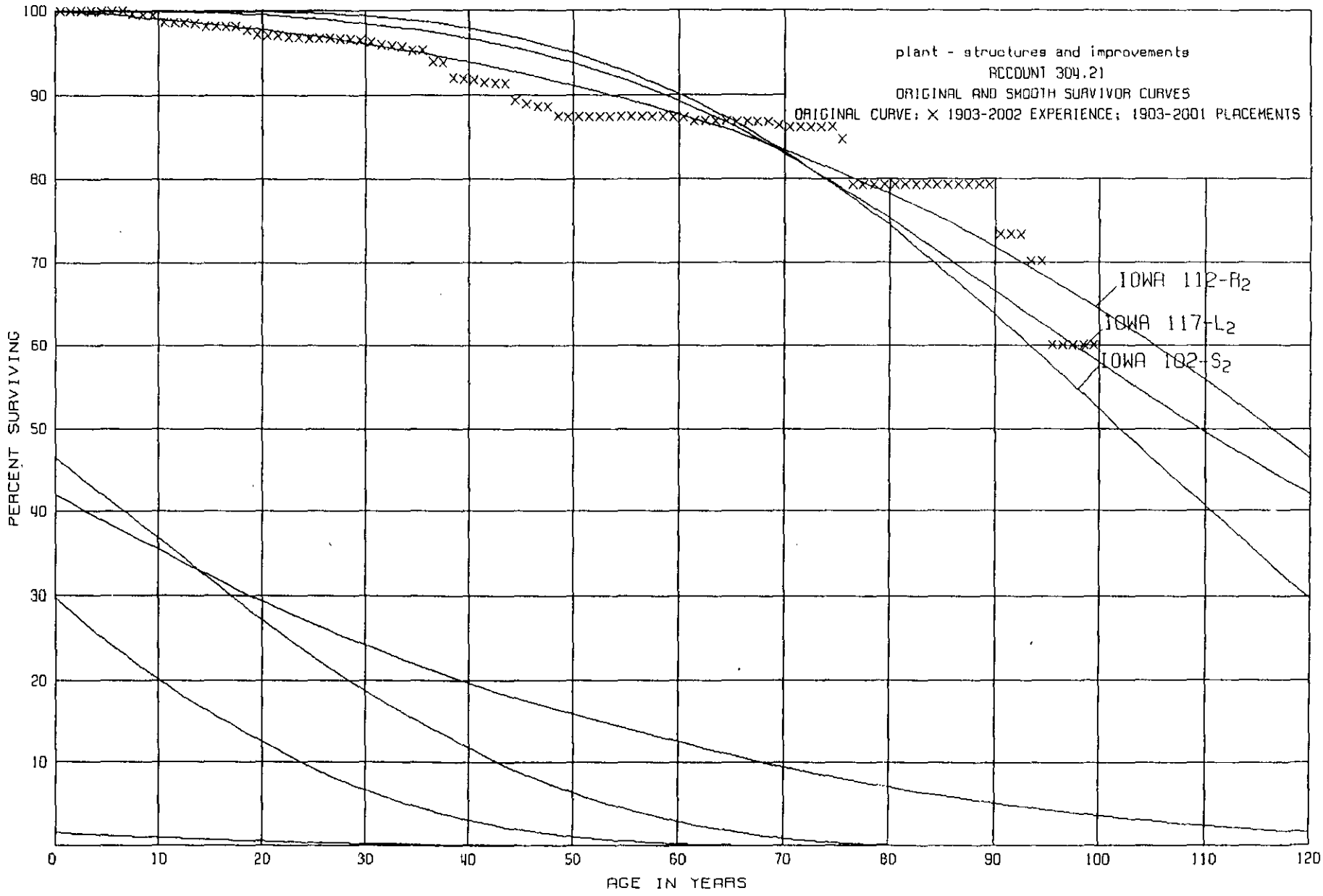
Total Band 91 years

* SEGMENT BETWEEN 85.0 AND 15.0 PERCENT SURVIVING.

Account 321

(MAWC Account 304.21&304.22)

Structures and Improvements – Pumping Plant



Schedule 4-12

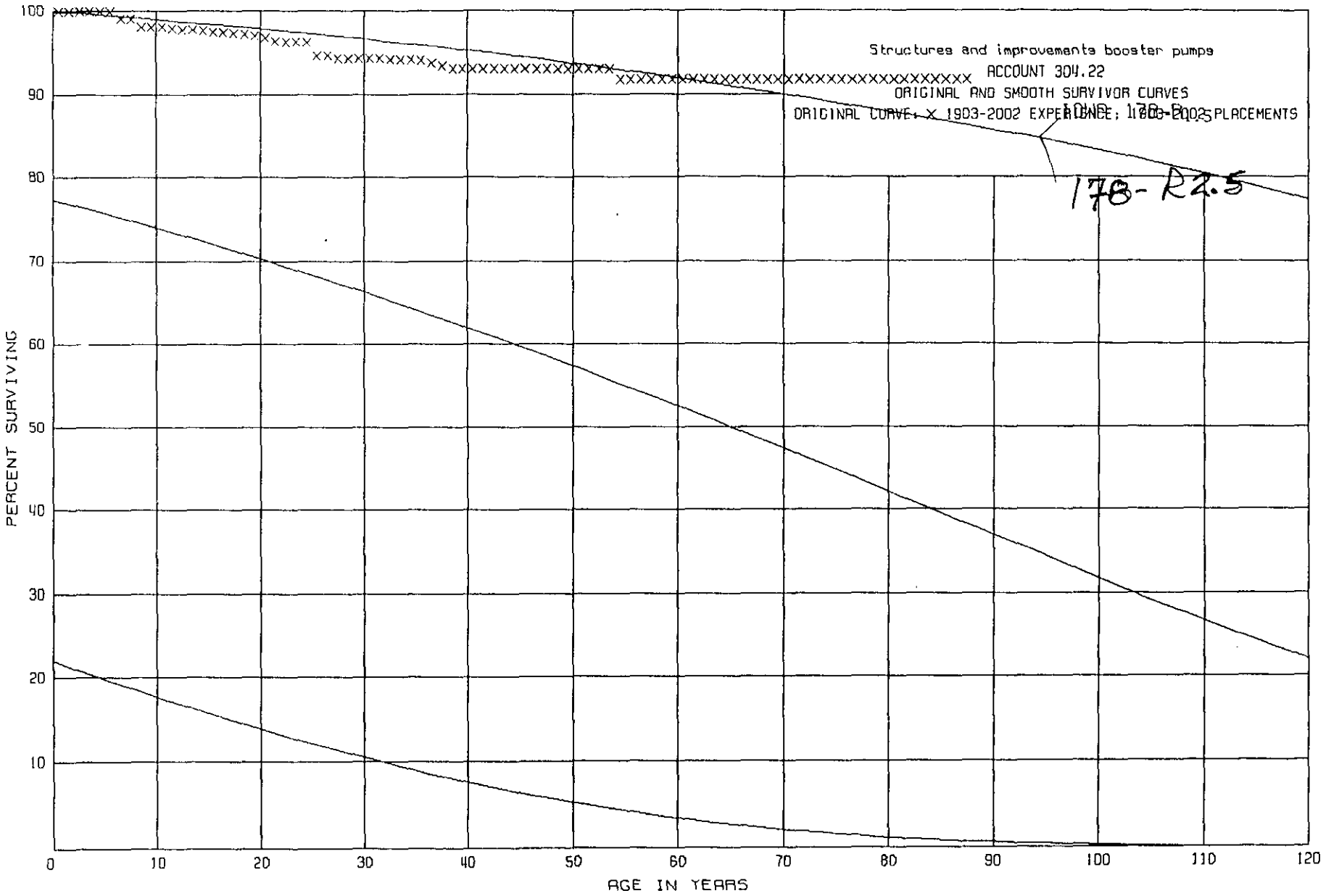
plant - structures and improvements

ACCOUNT 304.21

SUMMARY OF CURVE FITTING RESULTS - PCT SURV BALANCED AREAS

PLACEMENT BAND 1903-2001			EXPERIENCE BAND 1903-2002		
SURVIVOR CURVE	RESID MEAS	RANGE OF FIT	SURVIVOR CURVE	RESID MEAS	RANGE OF FIT*
140.0-S0	1.48	0 - 72		NOT FITTED	
120.1-S0.5	1.98	0 - 72		NOT FITTED	
104.6-S1	2.95	0 - 72		NOT FITTED	
208.0-R0.5	1.44	0 - 72		NOT FITTED	
161.5-R1	1.32	0 - 72		NOT FITTED	
130.5-R1.5	1.31	0 - 72		NOT FITTED	
107.2-R2	1.73	0 - 72		NOT FITTED	
93.9-R2.5	2.49	0 - 72		NOT FITTED	
203.8-L0	1.17 *	0 - 72		NOT FITTED	
165.6-L0.5	1.36	0 - 72		NOT FITTED	
136.0-L1	2.06	0 - 72		NOT FITTED	
260.6-O1	1.51	0 - 72		NOT FITTED	
293.0-O2	1.50	0 - 72		NOT FITTED	
320.0-O3	= STOP FITTING				
320.0-O4	= STOP FITTING				

* SEGMENT BETWEEN 85.0 AND 15.0 PERCENT SURVIVING.



Schedule 4-14

Structures and improvements booster pumps

ACCOUNT 304.22

SUMMARY OF CURVE FITTING RESULTS - PCT SURV BALANCED AREAS

PLACEMENT BAND 1903-2002 EXPERIENCE BAND 1903-2002

SURVIVOR CURVE	RESID MEAS	RANGE OF FIT	SURVIVOR CURVE	RESID MEAS	RANGE OF FIT*

NOT FITTED

* SEGMENT BETWEEN 85.0 AND 15.0 PERCENT SURVIVING.

Map years 88

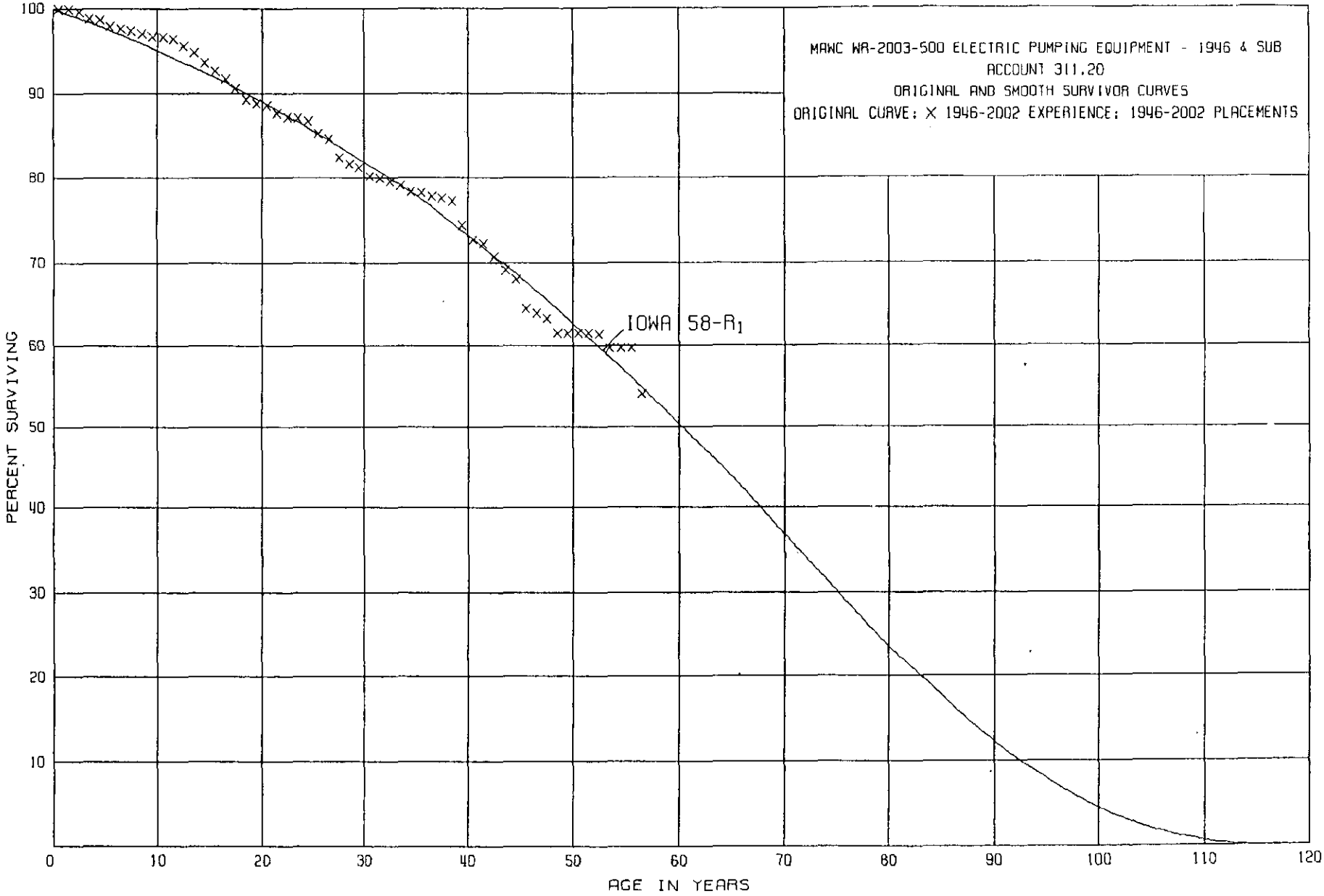
Account 325

(MAWC Account 311.10-311.30)

Electric Pumping Equipment

ITEMS

- Motors for Driving Pumps
- Pumps, including setting, gearing, shafting and belting
- Water Piping within Station, including valves
- Auxiliary Equipment for Motors and Pumps
- Electric Power Lines and Switching
- Regulating, Recording and Measuring Devices
- Foundations, Frames and Bed Plates
- Ladders, Stairs and Platforms



Schedule 4-18

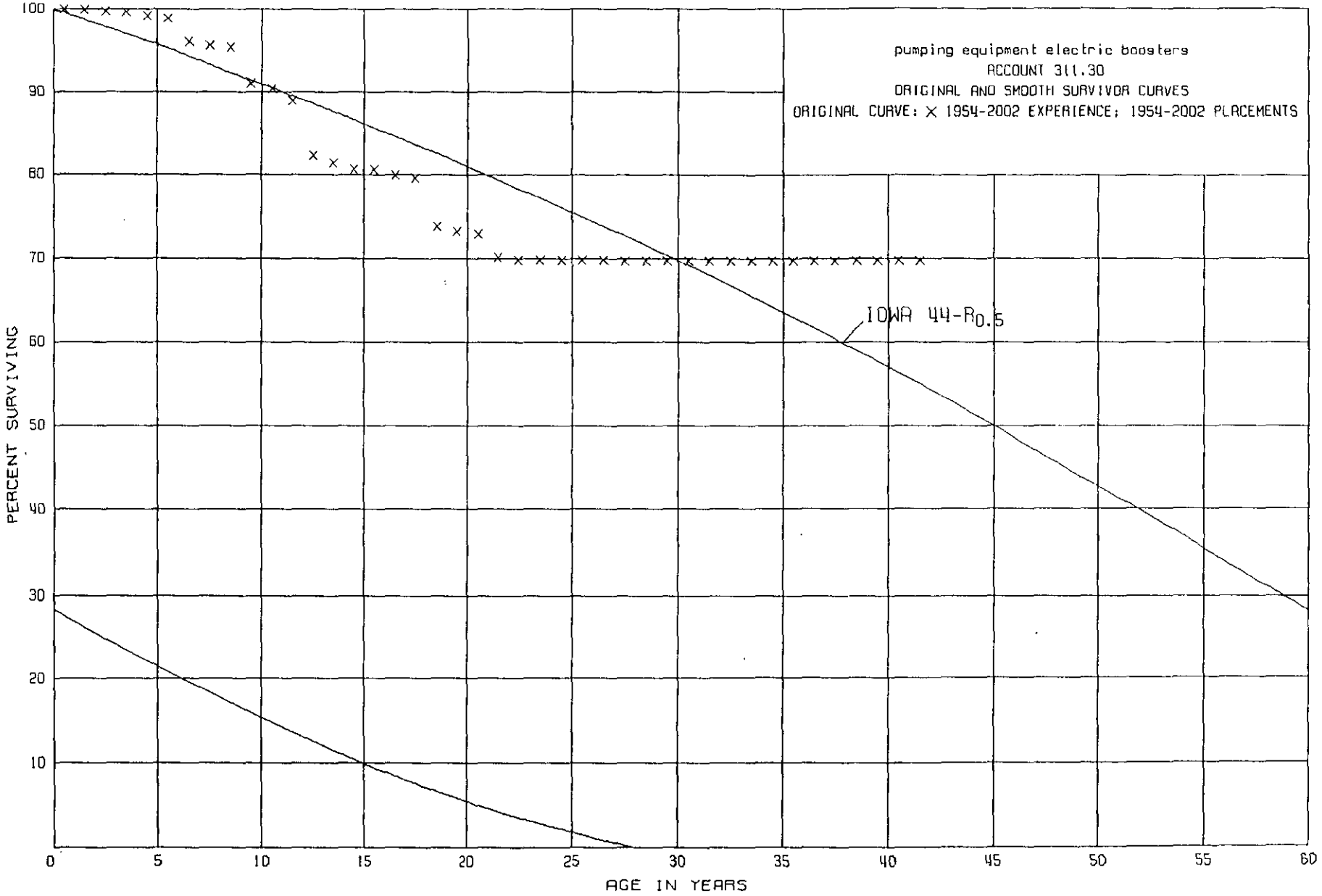
MAWC WR-2003-500 ELECTRIC PUMPING EQUIPMENT - 1946 & SUB

ACCOUNT 311.20

SUMMARY OF CURVE FITTING RESULTS - PCT SURV BALANCED AREAS

PLACEMENT BAND 1946-2002			EXPERIENCE BAND 1946-2002		
SURVIVOR CURVE	RESID MEAS	RANGE OF FIT	SURVIVOR CURVE	RESID MEAS	RANGE OF FIT*
58.3-S0	1.48	0 - 50	59.6-S0	1.50	26 - 50
53.9-S0.5	2.63	0 - 50	56.0-S0.5	2.07	26 - 50
50.5-S1	4.36	0 - 50	53.4-S1	3.24	26 - 50
67.5-R0.5	2.29	0 - 50	64.0-R0.5	2.09	26 - 50
58.2-R1	1.29	0 - 50	57.2-R1	1.35	26 - 50
52.7-R1.5	1.41	0 - 50	53.2-R1.5	1.58	26 - 50
48.8-R2	3.27	0 - 50	50.4-R2	2.98	26 - 50
75.5-L0	1.51	0 - 50	NOT FITTED		
66.9-L0.5	1.32	0 - 50	67.9-L0.5	1.58	26 - 50
60.5-L1	2.48	0 - 50	63.1-L1	1.95	26 - 50
55.7-L1.5	3.83	0 - 50	58.6-L1.5	3.01	26 - 50
79.6-O1	2.91	0 - 50	NOT FITTED		
89.6-O2	2.91	0 - 50	NOT FITTED		
128.5-O3	3.12	0 - 50	NOT FITTED		

* SEGMENT BETWEEN 85.0 AND 15.0 PERCENT SURVIVING.


pumping equipment electric boosters
ACCOUNT 311.30
ORIGINAL AND SMOOTH SURVIVOR CURVES
ORIGINAL CURVE: X 1954-2002 EXPERIENCE; 1954-2002 PLACEMENTS
IOWA 44-R0.5
PERCENT SURVIVING
AGE IN YEARS
100
90
80
70
60
50
40
30
20
10
0
5
10
15
20
25
30
35
40
45
50
55
60

pumping equipment electric boosters

ACCOUNT 311.30

SUMMARY OF CURVE FITTING RESULTS - PCT SURV BALANCED AREAS

PLACEMENT BAND 1954-2002			EXPERIENCE BAND 1954-2002		
SURVIVOR CURVE	RESID MEAS	RANGE OF FIT	SURVIVOR CURVE	RESID MEAS	RANGE OF FIT*
40.6-S0	8.84	0 - 42	NOT FITTED		
38.5-S0.5	10.70	0 - 42	NOT FITTED		
36.9-S1	12.78	0 - 42	NOT FITTED		
44.2-R0.5	6.22	0 - 42	NOT FITTED		
39.9-R1	[illegible]	0 - 42	NOT FITTED		
37.5-R1.5	10.11	0 - 42	NOT FITTED		
50.2-L0	6.52	0 - 42	NOT FITTED		
45.9-L0.5	8.00	0 - 42	NOT FITTED		
42.6-L1	9.72	0 - 42	NOT FITTED		
50.2-O1	5.18	0 - 42	NOT FITTED		
56.5-O2	5.17	0 - 42	NOT FITTED		
79.7-O3	4.77	0 - 42	NOT FITTED		
106.0-O4	4.58	0 - 42	NOT FITTED		

* SEGMENT BETWEEN 85.0 AND 15.0 PERCENT SURVIVING.

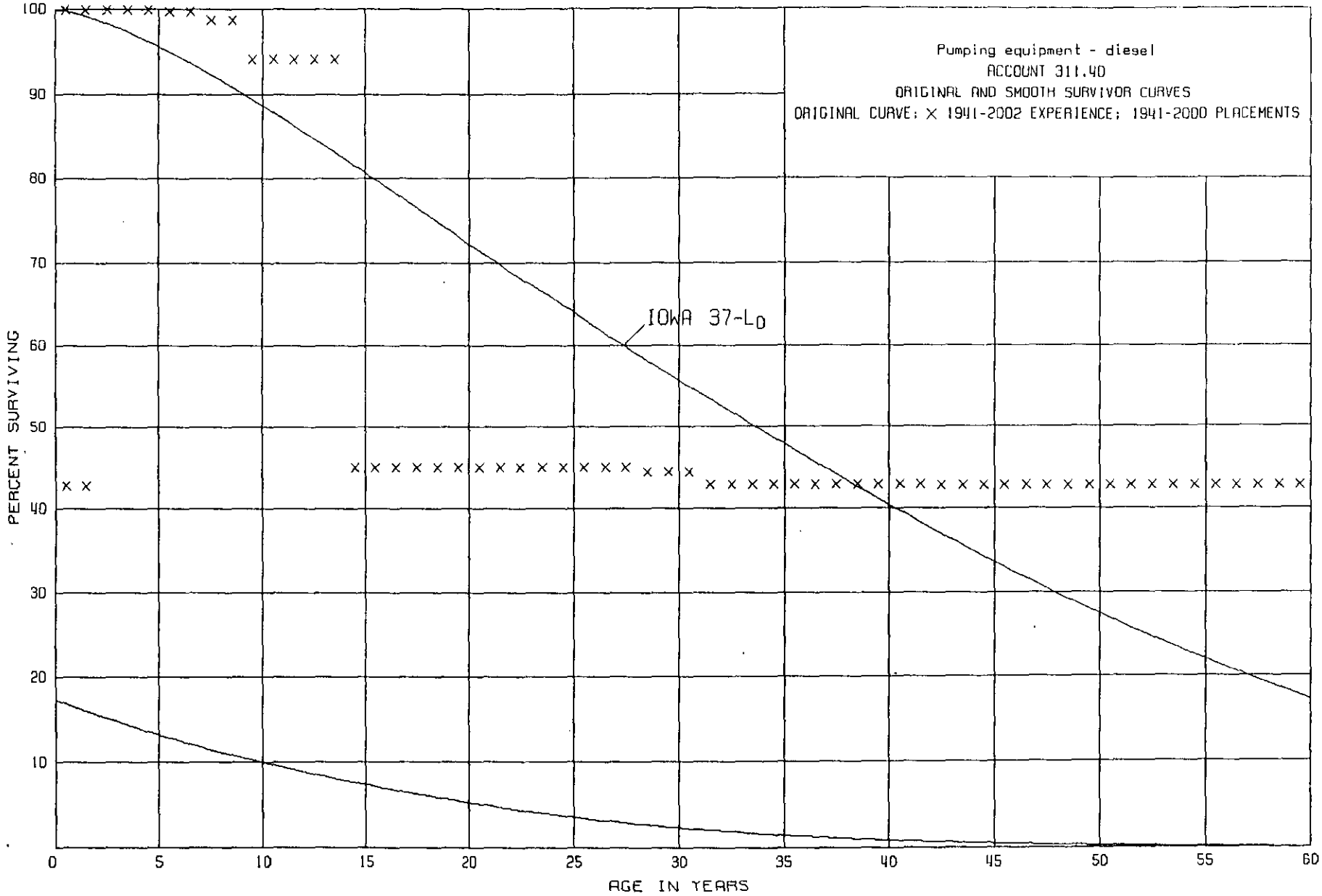
Account 326

(MAWC Account 311.40)

Diesel Pumping Equipment

ITEMS

- Engines for Driving Pumps
- Pumps, including setting, gearing, shafting and belting
- Water Piping within Station, including valves
- Auxiliary Equipment for Engines and Pumps
- Oil Supply Lines and Accessories
- Regulating, Recording and Measuring Devices
- Foundations, Frames and Bed Plates
- Ladders, Stairs and Platforms



Schedule 4-24

Pumping equipment - diesel

ACCOUNT 311.40

SUMMARY OF CURVE FITTING RESULTS - PCT SURV BALANCED AREAS

PLACEMENT BAND 1941-2000 EXPERIENCE BAND 1941-2002

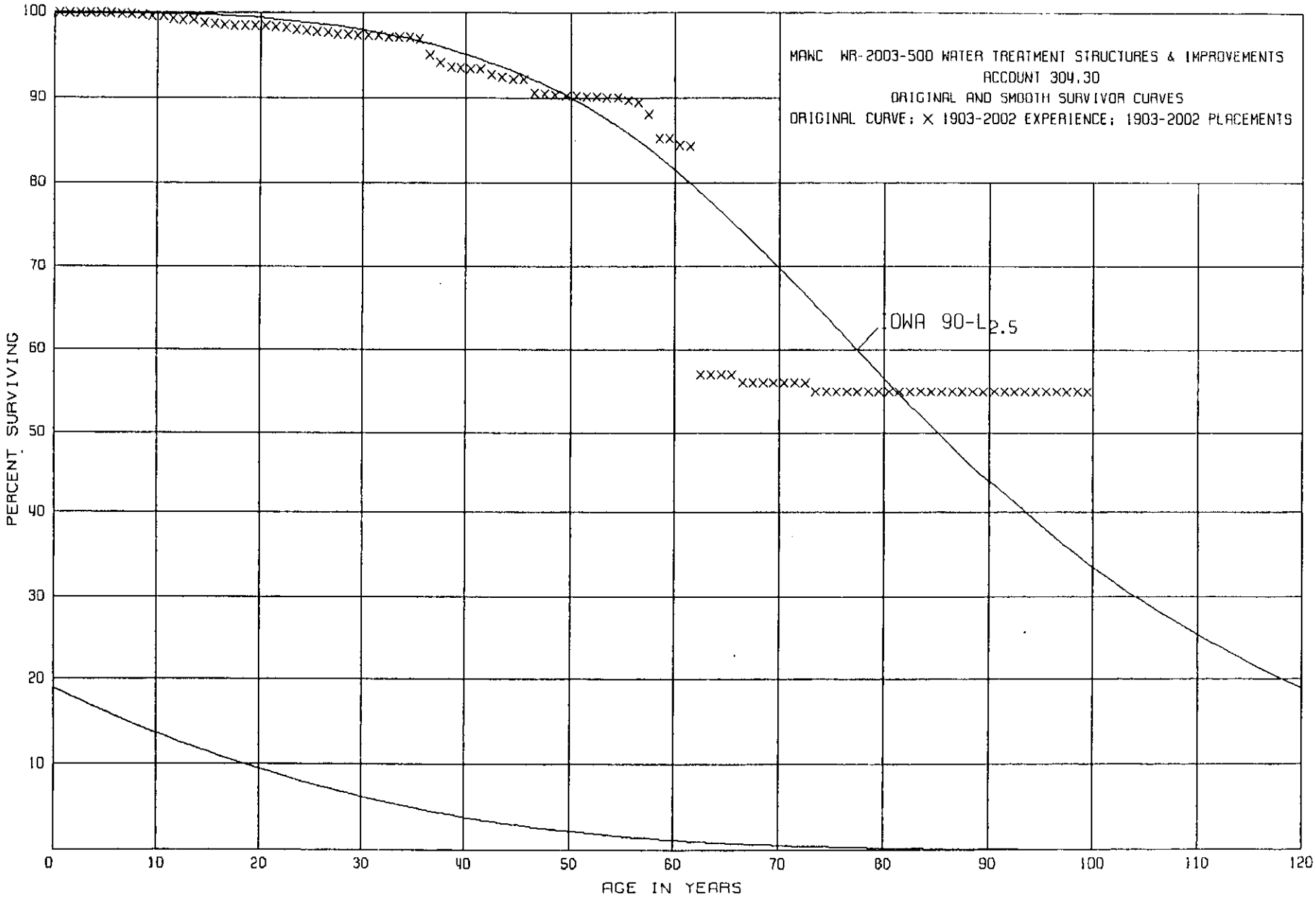
SURVIVOR CURVE	RESID MEAS	RANGE OF FIT	SURVIVOR CURVE	RESID MEAS	RANGE OF FIT*
29.3-S0	18.48	0 - 49	NOT FITTED		
29.2-S0.5	20.38	0 - 49	NOT FITTED		
29.1-S1	22.35	0 - 49	NOT FITTED		
29.6-R0.5	17.18	0 - 49	NOT FITTED		
29.2-R1	19.82	0 - 49	NOT FITTED		
29.1-R1.5	22.08	0 - 49	NOT FITTED		
31.8-L0	14.59	0 - 49	NOT FITTED		
30.9-L0.5	15.80	0 - 49	NOT FITTED		
30.2-L1	17.16	0 - 49	NOT FITTED		
30.0-O1	14.87	0 - 49	NOT FITTED		
33.4-O2	14.40	0 - 49	NOT FITTED		
41.8-O3	12.45	0 - 49	NOT FITTED		
52.1-O4	11.89	0 - 49	NOT FITTED		

* SEGMENT BETWEEN 85.0 AND 15.0 PERCENT SURVIVING.

Account 331

(MAWC Account 304.30)

Structures and Improvements – Water Treatment



Schedule 4-28

MAWC WR-2003-500 WATER TREATMENT STRUCTURES & IMPROVEMENTS

ACCOUNT 304.30

SUMMARY OF CURVE FITTING RESULTS - PCT SURV BALANCED AREAS

PLACEMENT BAND 1903-2002			EXPERIENCE BAND 1903-2002		
SURVIVOR CURVE	RESID MEAS	RANGE OF FIT	SURVIVOR CURVE	RESID MEAS	RANGE OF FIT*
135.3-S0	5.01	0 - 64		NOT FITTED	
114.7-S0.5	4.74	0 - 64		NOT FITTED	
98.5-S1	4.39	0 - 64		NOT FITTED	
88.9-S1.5	4.19	0 - 64		NOT FITTED	
80.9-S2	4.10	0 - 64		NOT FITTED	
76.0-S2.5	4.09	0 - 64		NOT FITTED	
71.8-S3	4.37	0 - 64		NOT FITTED	
65.6-S4	5.53	0 - 64		NOT FITTED	
211.0-R0.5	5.79	0 - 64		NOT FITTED	
161.7-R1	5.64	0 - 64		NOT FITTED	
128.6-R1.5	5.41	0 - 64		NOT FITTED	
103.1-R2	4.93	0 - 64		NOT FITTED	
88.9-R2.5	4.51	0 - 64		NOT FITTED	
78.3-R3	4.04	0 - 64		NOT FITTED	
68.4-R4	4.03	0 - 64		NOT FITTED	
63.0-R5	5.87	0 - 64		NOT FITTED	
200.8-L0	5.36	0 - 64		NOT FITTED	
161.1-L0.5	5.14	0 - 64		NOT FITTED	
129.8-L1	4.70	0 - 64		NOT FITTED	
111.1-L1.5	4.46	0 - 64		NOT FITTED	
95.7-L2	4.12	0 - 64		NOT FITTED	
86.8-L2.5	4.00	0 - 64		NOT FITTED	
79.1-L3	4.02	0 - 64		NOT FITTED	
69.2-L4	4.42	0 - 64		NOT FITTED	
266.1-O1	5.86	0 - 64		NOT FITTED	
299.2-O2	5.86	0 - 64		NOT FITTED	
320.0-O3	= STOP FITTING				
320.0-O4	= STOP FITTING				

* SEGMENT BETWEEN 85.0 AND 15.0 PERCENT SURVIVING.

Account 332

(MAWC Account 320.00)

Water Treatment Equipment

ITEMS

AERATORS
- Air Compressors
- Piping System, including valves
- Spray Nozzles
- Substructures

CHEMICAL TREATING PLANT
- Agitating Equipment
- Ammonia Machines
- Carbonating Equipment
- Chemical Manufacturing Plants
- Chemical Pumps
- Chemical Handling Equipment
- Chlorine Machines
- Coke
- Dry Feed Machines
- Dry Storage Bins
- Electrolytic Cell
- Elevator
- Fluoridation Equipment
- Gauges
- Gravity Feed or Pump Feed Apparatus
- Motors
- Piping System, including valves
- Rate Controllers
- Sludge Pumps
- Softening Equipment
- Solution Feed Equipment
- Solution Tanks
- Switchboards
- Weighting Equipment

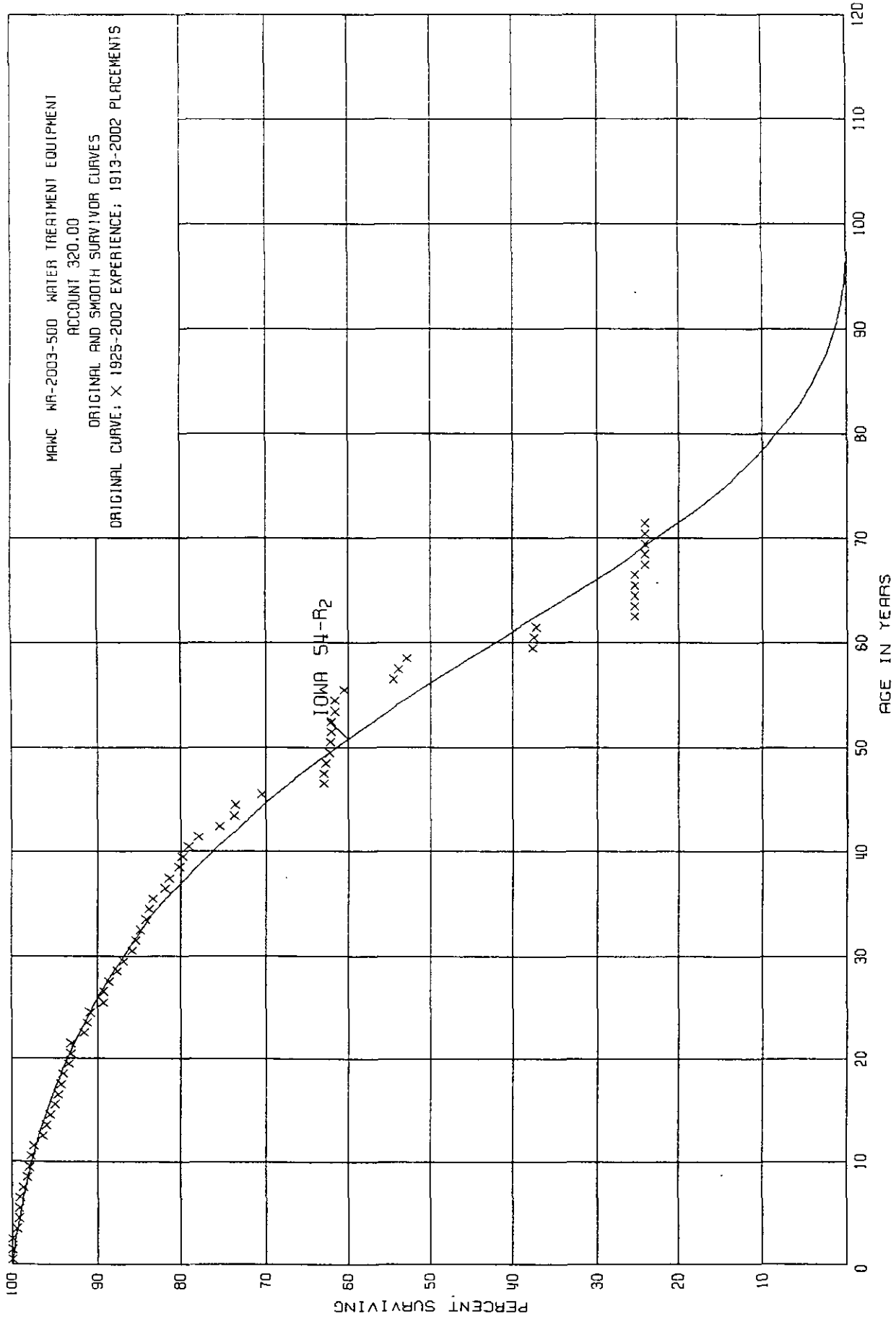
CLEAR WATER BASIN
- Basin
- Gauges
- Piping System, including valves
- Substructures

FILTER PLANT
- Air Blower and Compressor
- Filters
- Gauges
- Piping System
- Rate Controllers
- Sand, Gravel or Other Filter Media
- Substructures
- Surface Work Equipment
- Valve Control Tables
- Valve Operating Mechanism
- Valves
- Wash Troughs
- Wash Water Pumps
- Wash Water Tanks

MIXING CHAMBERS
- Piping System, including valves
- Chambers
- Mechanical Mixers

SEDIMENTATION OR COAGULATION BASIN
- Basins
- Coagulant Storage Tanks
- Feeder Equipment
- Industrial Railroad
- Mechanical Mixers
- Orifice Devices
- Piping System, including valves
- Screens and Hoists
- Sludge Removal Apparatus

SOFTENING PLANT
- Carbonating Chambers and Equipment
- Clear Water Basins
- Gauges
- Gravel
- Meters
- Mixing Tanks and Chambers
- Permanent Chemical Softening Agents
- Piping System, including valves
- Salt Solution or Brine Tanks and Appurtenances
- Salt Solution Pumps
- Salt Storage Bins
- Sedimentation or Coagulation Basis
- Substructures
- Underdrain Systems
- Wash Water Controllers


MAWC WA-2003-500 WATER TREATMENT EQUIPMENT
ACCOUNT 320.00
ORIGINAL AND SMOOTH SURVIVOR CURVES
ORIGINAL CURVE: X 1925-2002 EXPERIENCE; 1913-2002 PLACEMENTS
IOWA 54-R2
PERCENT SURVIVING
AGE IN YEARS
100
90
80
70
60
50
40
30
20
10
0
10
20
30
40
50
60
70
80
90
100
110
120

MAWC WR-2003-500 WATER TREATMENT EQUIPMENT

ACCOUNT 320.00

SUMMARY OF CURVE FITTING RESULTS - PCT SURV BALANCED AREAS

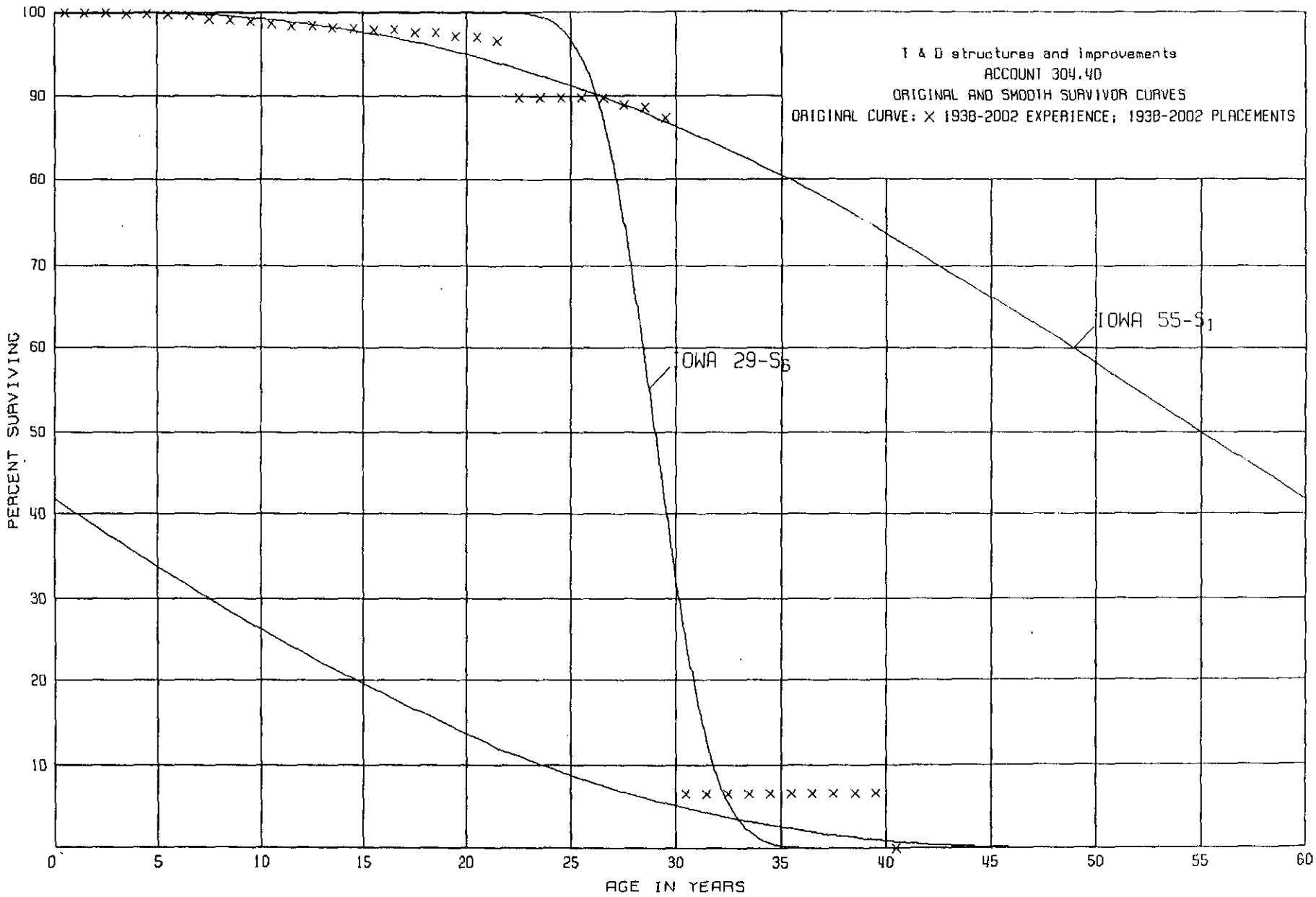
PLACEMENT BAND 1913-2002			EXPERIENCE BAND 1925-2002		
SURVIVOR CURVE	RESID MEAS	RANGE OF FIT	SURVIVOR CURVE	RESID MEAS	RANGE OF FIT*
66.8-S0	2.31	0 - 53	NOT FITTED		
61.0-S0.5	1.73	0 - 53	NOT FITTED		
56.7-S1	2.29	0 - 53	NOT FITTED		
53.7-S1.5	3.32	0 - 53	NOT FITTED		
79.8-R0.5	4.43	0 - 53	NOT FITTED		
67.6-R1	3.47	0 - 53	NOT FITTED		
60.2-R1.5	2.28	0 - 53	NOT FITTED		
54.9-R2	1.44	0 - 53	NOT FITTED		
51.6-R2.5	2.53	0 - 53	53.0-R2.5	2.48	32 - 53
49.2-R3	4.70	0 - 53	51.4-R3	3.80	32 - 53
88.1-L0	3.49	0 - 53	NOT FITTED		
77.1-L0.5	2.58	0 - 53	NOT FITTED		
68.8-L1	1.92	0 - 53	NOT FITTED		
62.7-L1.5	1.99	0 - 53	NOT FITTED		
58.1-L2	3.44	0 - 53	NOT FITTED		
95.3-O1	4.92	0 - 53	NOT FITTED		
107.2-O2	4.92	0 - 53	NOT FITTED		
154.6-O3	5.08	0 - 53	NOT FITTED		

* SEGMENT BETWEEN 85.0 AND 15.0 PERCENT SURVIVING.

Account 341

(MAWC Account 304.40&304.46)

Structures and Improvements – Transmission and Distribution


T & D structures and improvements
ACCOUNT 304.40
ORIGINAL AND SMOOTH SURVIVOR CURVES
ORIGINAL CURVE: X 1938-2002 EXPERIENCE; 1938-2002 PLACEMENTS
IOWA 55-S1
IOWA 29-S6
PERCENT SURVIVING
AGE IN YEARS
100
90
80
70
60
50
40
30
20
10
0
5
10
15
20
25
30
35
40
45
50
55
60

T & D structures and improvements

ACCOUNT 304.40

SUMMARY OF CURVE FITTING RESULTS - PCT SURV BALANCED AREAS

PLACEMENT BAND 1938-2002 EXPERIENCE BAND 1938-2002

SURVIVOR CURVE	RESID MEAS	RANGE OF FIT	SURVIVOR CURVE	RESID MEAS	RANGE OF FIT*
60.9-S0	14.00	0 - 31	NOT FITTED		
52.2-S0.5	13.71	0 - 31	NOT FITTED		
45.4-S1	13.28	0 - 31	NOT FITTED		
41.2-S1.5	12.94	0 - 31	NOT FITTED		
37.8-S2	12.51	0 - 31	NOT FITTED		
35.7-S2.5	12.17	0 - 31	NOT FITTED		
33.8-S3	11.78	0 - 31	NOT FITTED		
31.1-S4	11.06	0 - 31	NOT FITTED		
29.8-S5	10.62	0 - 31	NOT FITTED		
29.1-S6	10.89	0 - 31	NOT FITTED		
91.1-R0.5	14.70	0 - 31	NOT FITTED		
70.6-R1	14.55	0 - 31	NOT FITTED		
56.9-R1.5	14.31	0 - 31	NOT FITTED		
46.6-R2	13.84	0 - 31	NOT FITTED		
40.7-R2.5	13.38	0 - 31	NOT FITTED		
36.4-R3	12.73	0 - 31	NOT FITTED		
32.2-R4	11.65	0 - 31	NOT FITTED		
30.0-R5	10.47	0 - 31	NOT FITTED		
88.9-L0	14.34	0 - 31	NOT FITTED		
72.1-L0.5	14.11	0 - 31	NOT FITTED		
59.1-L1	13.67	0 - 31	NOT FITTED		
51.0-L1.5	13.38	0 - 31	NOT FITTED		
44.4-L2	12.83	0 - 31	NOT FITTED		
40.5-L2.5	12.53	0 - 31	NOT FITTED		
37.2-L3	12.02	0 - 31	NOT FITTED		
32.8-L4	11.18	0 - 31	NOT FITTED		
30.7-L5	10.52	0 - 31	NOT FITTED		
114.2-O1	14.76	0 - 31	NOT FITTED		
128.4-O2	14.76	0 - 31	NOT FITTED		
187.9-O3	14.78	0 - 31	NOT FITTED		

* SEGMENT BETWEEN 85.0 AND 15.0 PERCENT SURVIVING.

MAWC WR-2003-500 STRUCTURES AND IMPROVEMTNES – RIVER CROSSING

ACCOUNT 304.46

NO RETIREMENTS

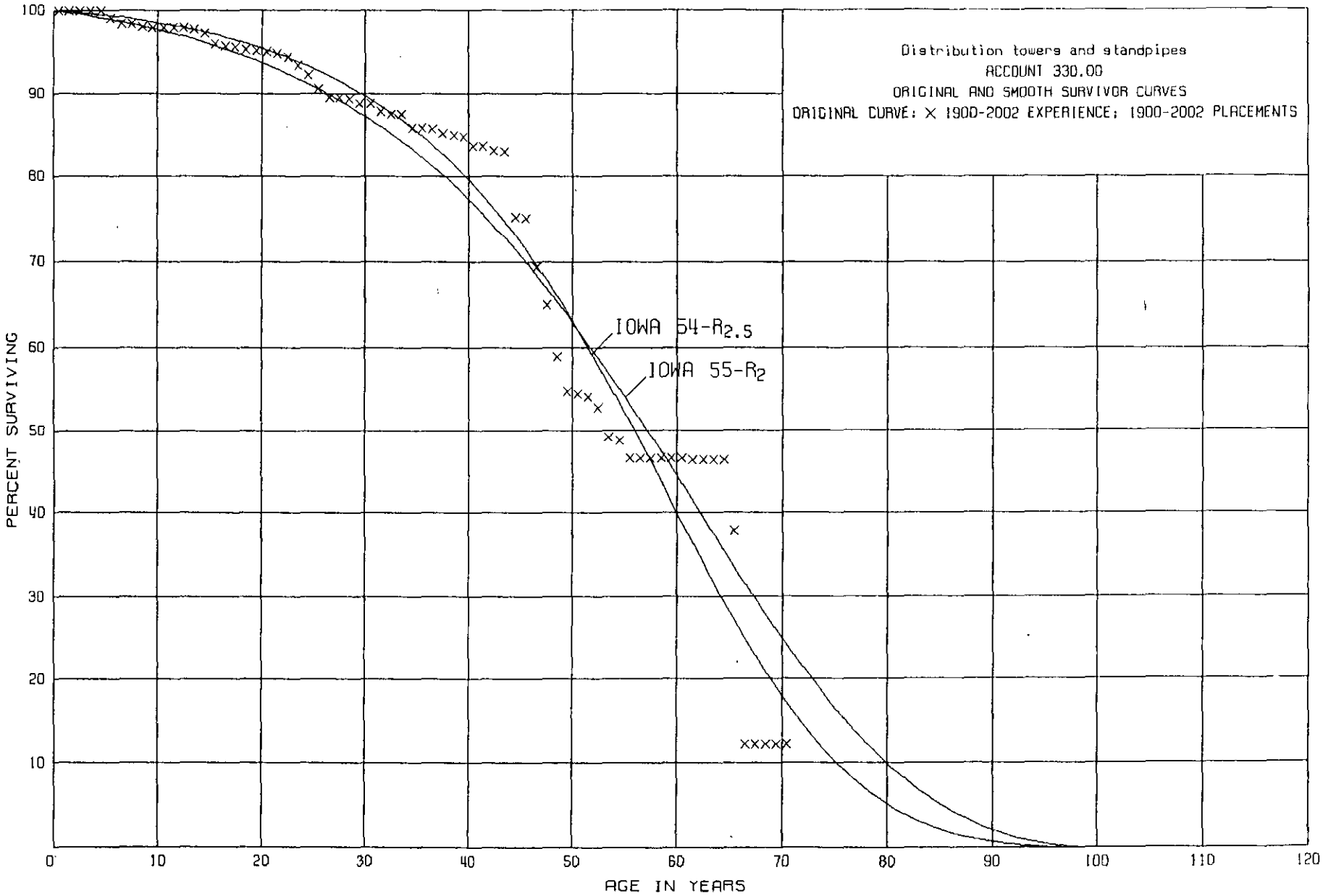
Account 342

(MAWC Account 330.00)

Distribution Reservoirs and Standpipes

ITEMS

- Aerators
- Bridges and Culverts
- Clearing Land
- Dams
- Embankments
- Fences
- Foundations
- Gates and Gate Houses
- Landscaping
- Lighting Systems
- Piping System within Reservoirs
- Retaining Walls
- Roads and Paths
- Rust-proofing Apparatus
- Sewers
- Spillways and Channels
- Standpipes
- Superstructures
- Tanks
- Towers
- Valves and Appurtenances
- Valve Vaults and Houses
- Water level Control Apparatus



Schedule 4-42

Distribution towers and standpipes

ACCOUNT 330.00

SUMMARY OF CURVE FITTING RESULTS - PCT SURV BALANCED AREAS

PLACEMENT BAND 1900-2002			EXPERIENCE BAND 1900-2002		
SURVIVOR CURVE	RESID MEAS	RANGE OF FIT	SURVIVOR CURVE	RESID MEAS	RANGE OF FIT*
76.4-S0	3.21	0 - 49	NOT FITTED		
67.7-S0.5	2.87	0 - 49	NOT FITTED		
61.0-S1	2.92	0 - 49	NOT FITTED		
56.7-S1.5	3.21	0 - 49	NOT FITTED		
100.9-R0.5	4.51	0 - 49	NOT FITTED		
81.5-R1	4.06	0 - 49	NOT FITTED		
69.1-R1.5	3.44	0 - 49	NOT FITTED		
60.2-R2	2.69	0 - 49	NOT FITTED		
54.7-R2.5	2.46	0 - 49	NOT FITTED		
50.8-R3	3.24	0 - 49	NOT FITTED		
46.9-R4	5.91	0 - 49	NOT FITTED		
105.9-L0	3.81	0 - 49	NOT FITTED		
89.3-L0.5	3.34	0 - 49	NOT FITTED		
76.8-L1	2.92	0 - 49	NOT FITTED		
68.0-L1.5	2.80	0 - 49	NOT FITTED		
61.4-L2	3.38	0 - 49	NOT FITTED		
56.9-L2.5	3.87	0 - 49	NOT FITTED		
123.8-O1	4.71	0 - 49	NOT FITTED		
139.3-O2	4.71	0 - 49	NOT FITTED		
202.6-O3	4.77	0 - 49	NOT FITTED		

* SEGMENT BETWEEN 85.0 AND 15.0 PERCENT SURVIVING.

7 pages total

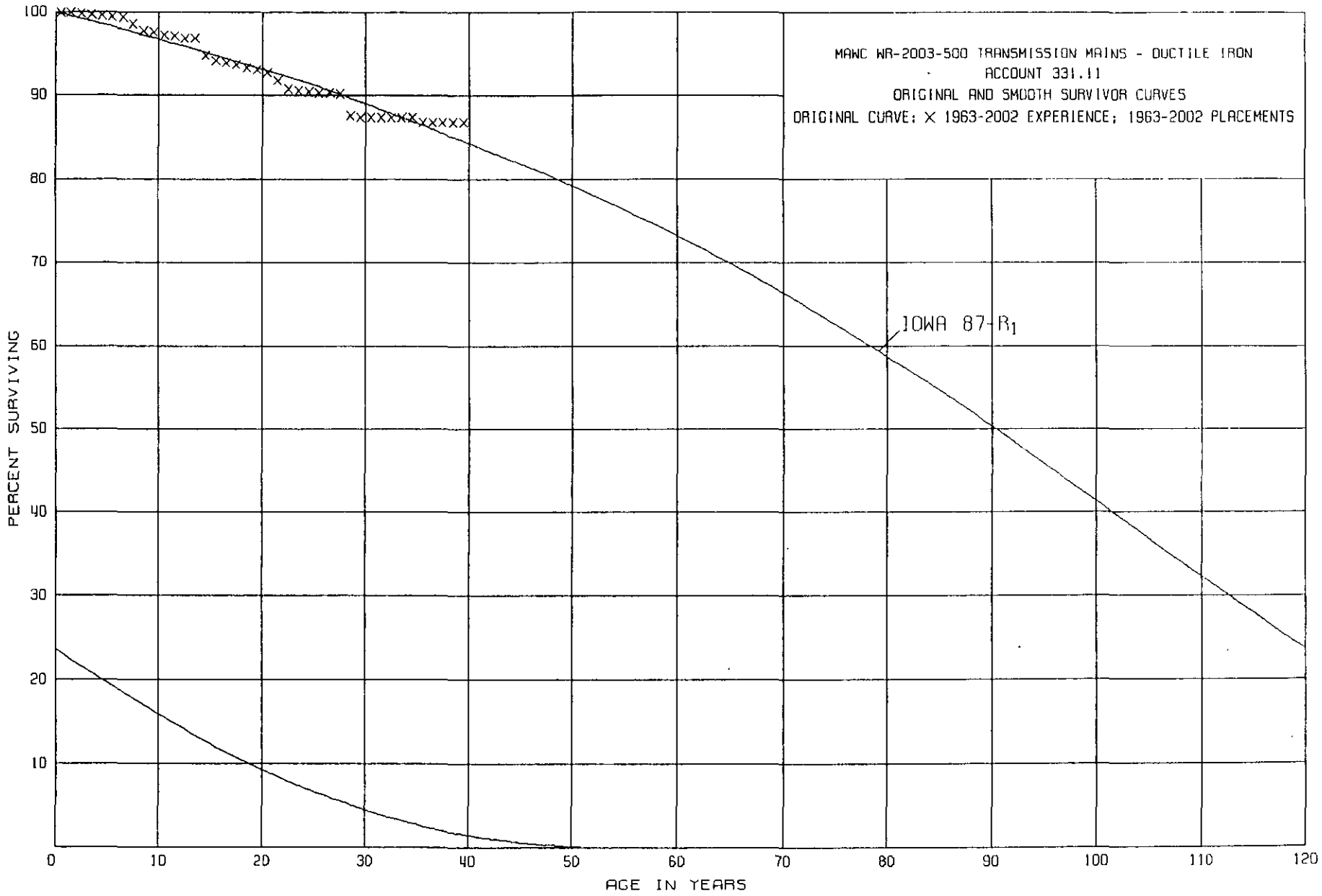
Account 343

(MAWC Account 331.11-331.30)

Transmission and Distribution Mains

ITEMS

- Air Chambers
- Blow-offs and Overflows
- Bridges and Culverts
- Canals
- Electrolysis Control Equipment
- Gauges and Recorders
- Jointing and Jointing Materials
- Manholes
- Meters and Meter Houses
- Municipal Inspection or Permits
- Pavement Disturbed
- Pipes
- Placing Mains and Accessories
- Pressure Regulators
- Protection of Street Openings
- Shut-offs
- Special Castings
- Sterilizing New Mains
- Surge Tanks
- Trenching
- Tunnels
- Valves and Appurtenances
- Valve Vaults



Schedule 4-46

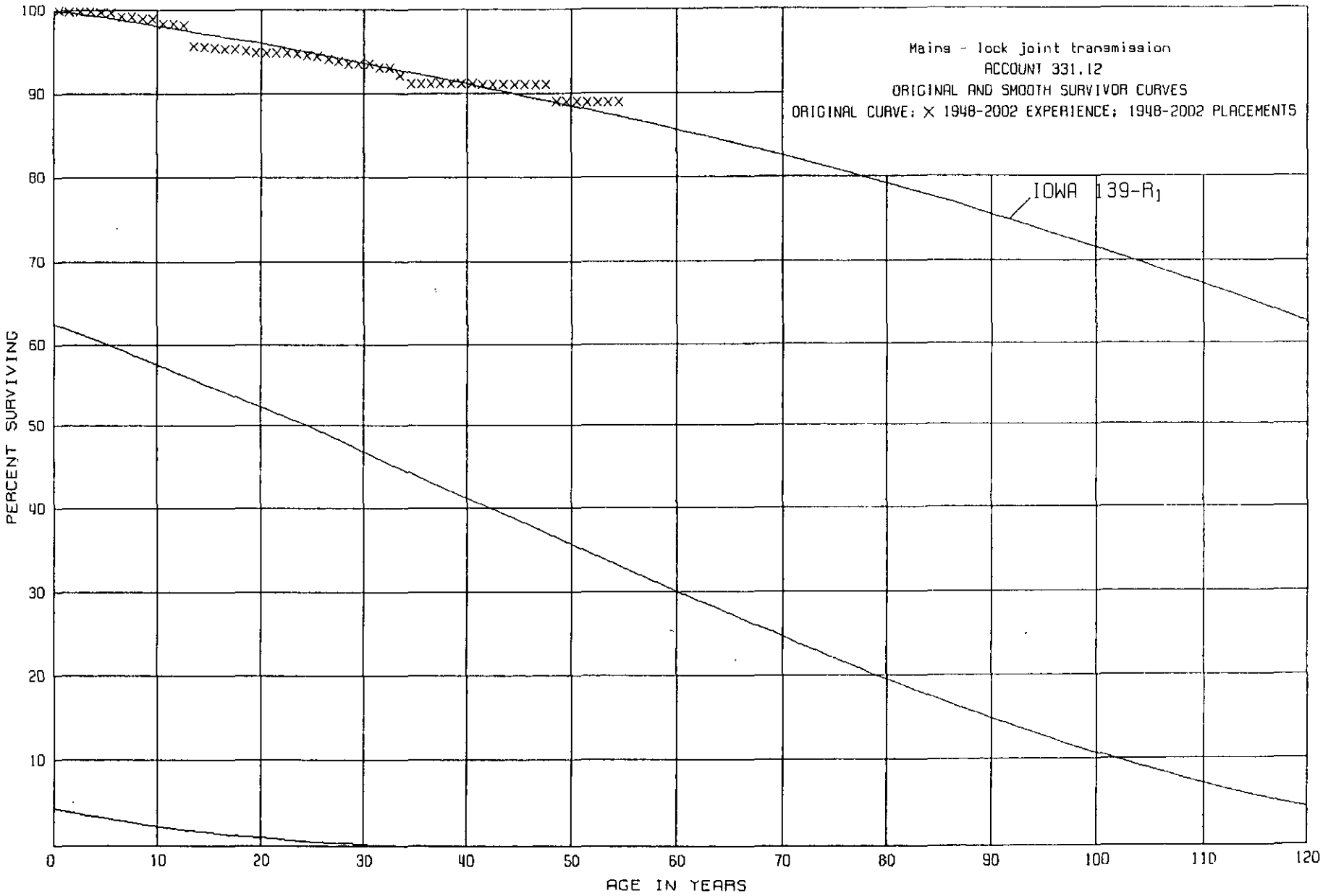
MAWC WR-2003-500 TRANSMISSION MAINS - DUCTILE IRON

ACCOUNT 331.11

SUMMARY OF CURVE FITTING RESULTS - PCT SURV BALANCED AREAS

PLACEMENT BAND 1963-2002			EXPERIENCE BAND 1963-2002		
SURVIVOR CURVE	RESID MEAS	RANGE OF FIT	SURVIVOR CURVE	RESID MEAS	RANGE OF FIT*
70.3-S0	0.80	0 - 32	NOT FITTED		
59.3-S0.5	1.23	0 - 32	NOT FITTED		
50.6-S1	2.11	0 - 32	NOT FITTED		
112.2-R0.5	1.04	0 - 32	NOT FITTED		
85.5-R1	0.88	0 - 32	NOT FITTED		
67.5-R1.5	0.73	0 - 32	NOT FITTED		
53.5-R2	0.87	0 - 32	NOT FITTED		
45.8-R2.5	1.45	0 - 32	NOT FITTED		
105.2-L0	0.58	0 - 32	NOT FITTED		
84.0-L0.5	0.67	0 - 32	NOT FITTED		
67.0-L1	1.29	0 - 32	NOT FITTED		
141.8-O1	1.10	0 - 32	NOT FITTED		
159.5-O2	1.10	0 - 32	NOT FITTED		
233.8-O3	1.12	0 - 32	NOT FITTED		

* SEGMENT BETWEEN 85.0 AND 15.0 PERCENT SURVIVING.


Mains - lock joint transmission
ACCOUNT 331.12
ORIGINAL AND SMOOTH SURVIVOR CURVES
ORIGINAL CURVE: X 1948-2002 EXPERIENCE; 1948-2002 PLACEMENTS
IOWA 139-R1
PERCENT SURVIVING
AGE IN YEARS
100
90
80
70
60
50
40
30
20
10
0
10
20
30
40
50
60
70
80
90
100
110
120

Mains - lock joint transmission

ACCOUNT 331.12

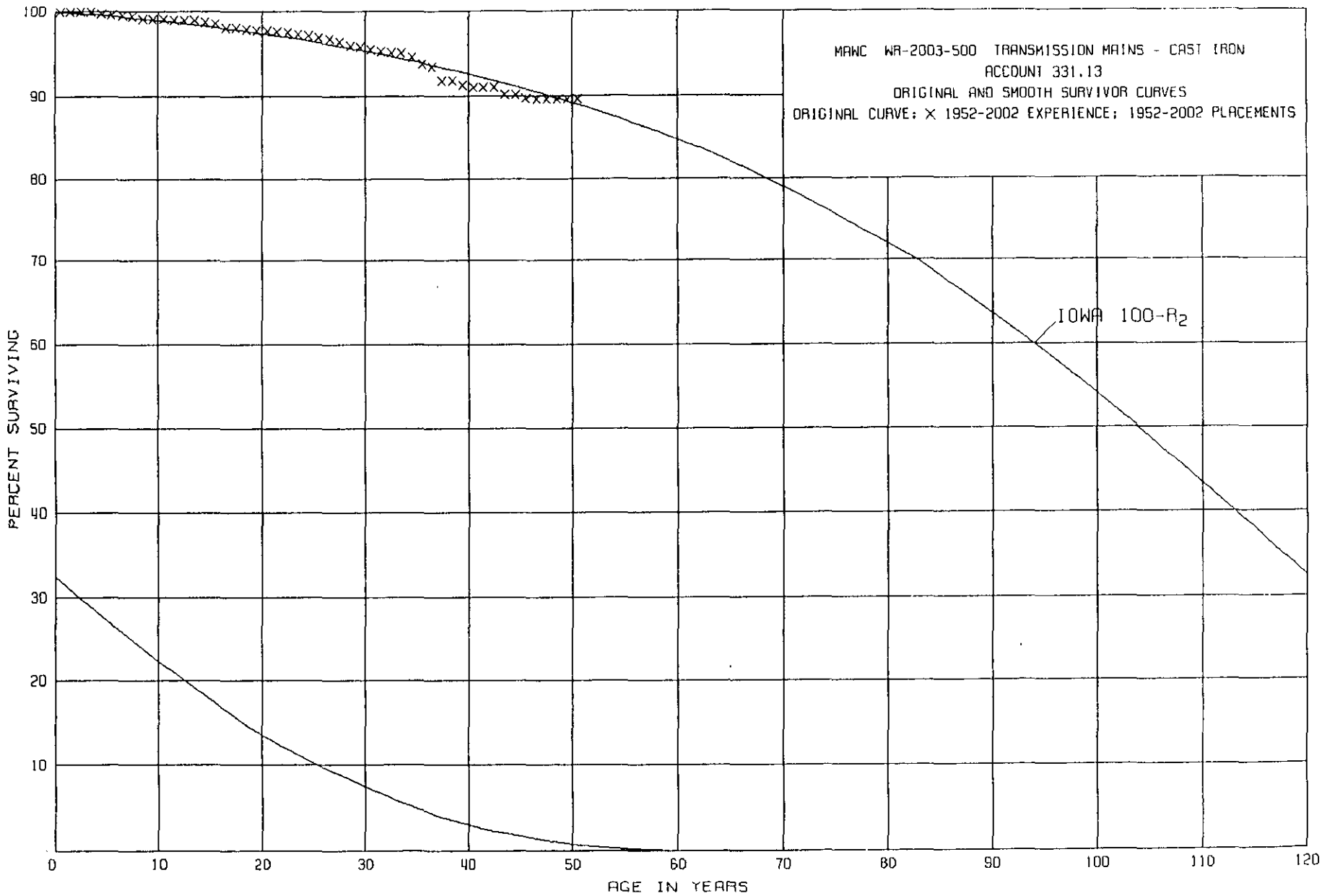
SUMMARY OF CURVE FITTING RESULTS - PCT SURV BALANCED AREAS

PLACEMENT BAND 1948-2002 EXPERIENCE BAND 1948-2002

SURVIVOR CURVE	RESID MEAS	RANGE OF FIT	SURVIVOR CURVE	RESID MEAS	RANGE OF FIT*
115.9-S0	1.91	0 - 55		NOT FITTED	
98.4-S0.5	2.42	0 - 55		NOT FITTED	
84.5-S1	3.38	0 - 55		NOT FITTED	
180.5-R0.5	0.75	0 - 55		NOT FITTED	
138.4-R1	0.89	0 - 55		NOT FITTED	
110.1-R1.5	1.16	0 - 55		NOT FITTED	
171.9-L0	1.30	0 - 55		NOT FITTED	
138.0-L0.5	1.61	0 - 55		NOT FITTED	
111.3-L1	2.47	0 - 55		NOT FITTED	
227.5-O1	0.70	0 - 55		NOT FITTED	
255.8-O2	0.70	0 - 55		NOT FITTED	
320.0-O3	= STOP FITTING				
320.0-O4	= STOP FITTING				

* SEGMENT BETWEEN 85.0 AND 15.0 PERCENT SURVIVING.

Full Band 55



Schedule 4-50

MAWC WR-2003-500 TRANSMISSION MAINS - CAST IRON

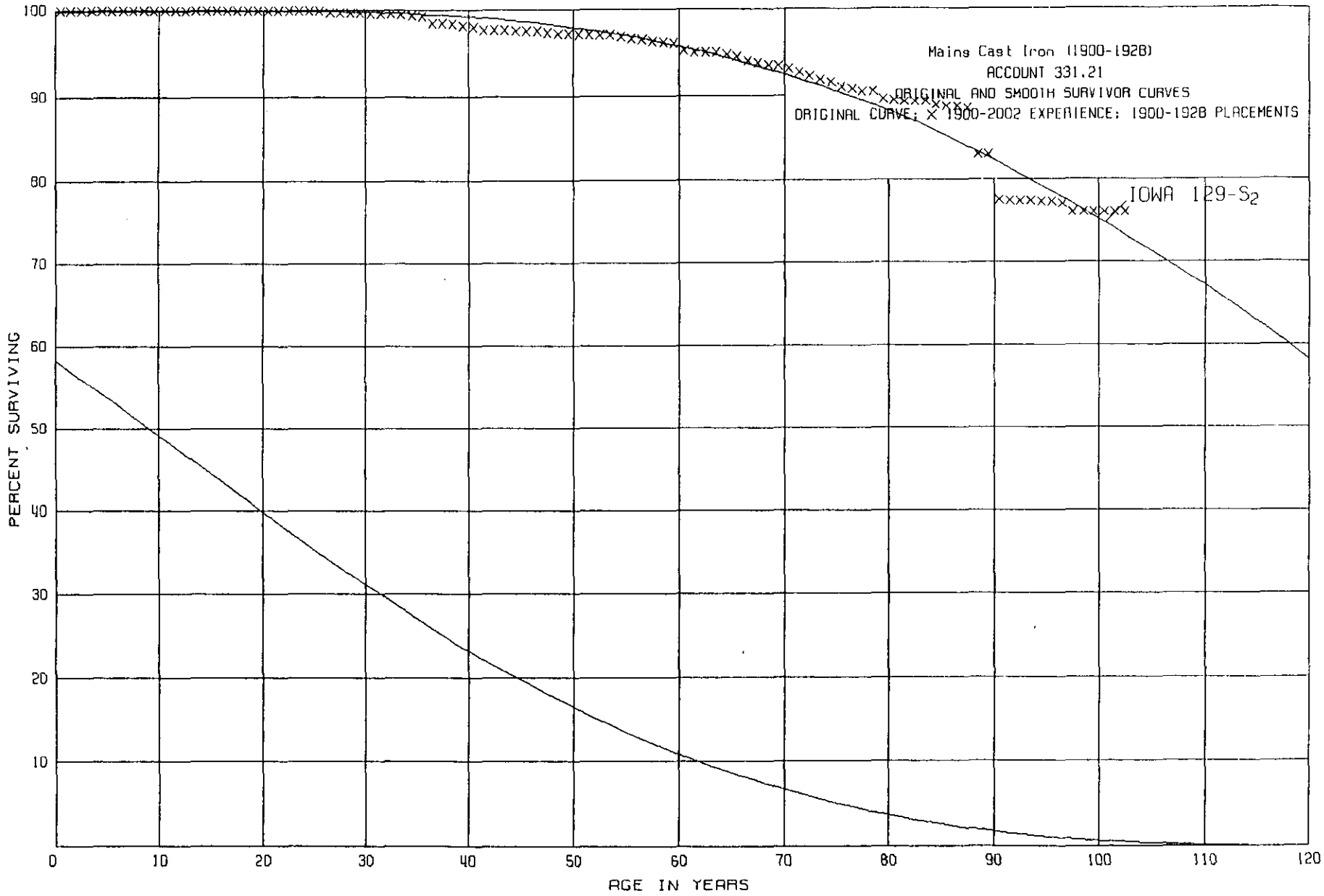
ACCOUNT 331.13

SUMMARY OF CURVE FITTING RESULTS - PCT SURV BALANCED AREAS

PLACEMENT BAND 1900-2002 1 EXPERIENCE BAND 1900-2002

SURVIVOR CURVE	RESID MEAS	RANGE OF FIT	SURVIVOR CURVE	RESID MEAS	RANGE OF FIT*
151.9-S0	1.93	0 - 93	NOT FITTED		
133.7-S0.5	2.34	0 - 93	NOT FITTED		
119.7-S1	3.33	0 - 93	NOT FITTED		
205.4-R0.5	2.26	0 - 93	NOT FITTED		
164.4-R1	1.99	0 - 93	NOT FITTED		
138.0-R1.5	1.76	0 - 93	NOT FITTED		
118.7-R2	2.09	0 - 93	NOT FITTED		
107.2-R2.5	2.94	0 - 93	NOT FITTED		
212.8-L0	1.85	0 - 93	NOT FITTED		
177.9-L0.5	1.83	0 - 93	NOT FITTED		
151.6-L1	2.41	0 - 93	NOT FITTED		
133.6-L1.5	2.98	0 - 93	NOT FITTED		
253.4-O1	2.40	0 - 93	NOT FITTED		
284.9-O2	2.40	0 - 93	NOT FITTED		
320.0-O3	= STOP FITTING				
320.0-O4	= STOP FITTING				

* SEGMENT BETWEEN 85.0 AND 15.0 PERCENT SURVIVING.


Mains Cast Iron (1900-1928)
ACCOUNT 331.21
ORIGINAL AND SMOOTH SURVIVOR CURVES
ORIGINAL CURVE: X 1900-2002 EXPERIENCE: 1900-1928 PLACEMENTS
IOWA 129-S2
PERCENT SURVIVING
AGE IN YEARS
100
90
80
70
60
50
40
30
20
10
0
10
20
30
40
50
60
70
80
90
100
110
120

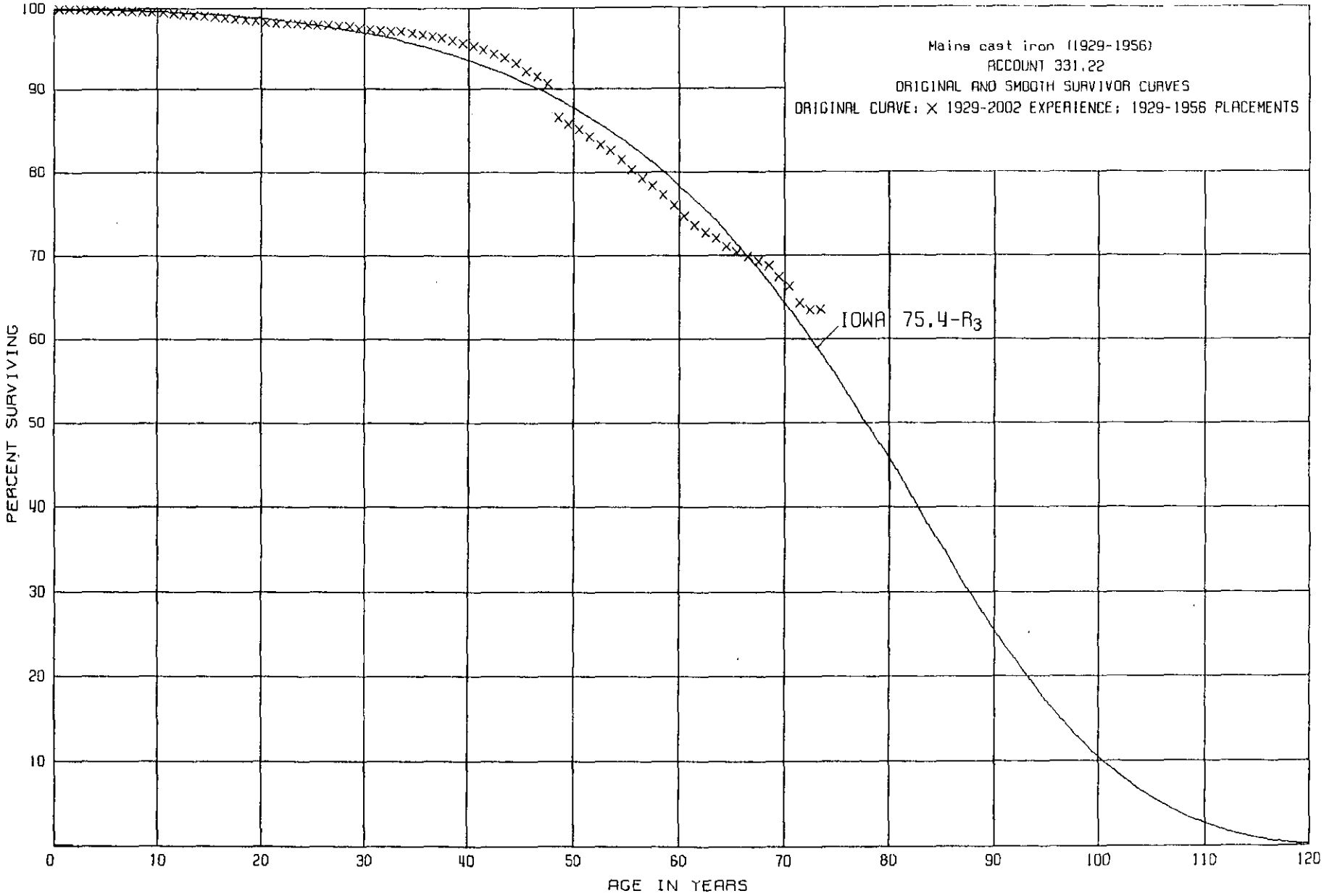
Mains Cast Iron (1900-1928)

ACCOUNT 331.21

SUMMARY OF CURVE FITTING RESULTS - PCT SURV BALANCED AREAS

PLACEMENT BAND 1900-1928			EXPERIENCE BAND 1900-2002		
SURVIVOR CURVE	RESID MEAS	RANGE OF FIT	SURVIVOR CURVE	RESID MEAS	RANGE OF FIT*
214.7-S0	3.44	0 -103		NOT FITTED	
182.4-S0.5	2.95	0 -103		NOT FITTED	
157.0-S1	2.15	0 -103		NOT FITTED	
141.8-S1.5	1.67	0 -103		NOT FITTED	
129.3-S2	1.31	0 -103		NOT FITTED	
121.5-S2.5	1.47	0 -103		NOT FITTED	
115.0-S3	2.25	0 -103		NOT FITTED	
320.0-R0.5	= STOP FITTING				
255.0-R1	4.48	0 -103		NOT FITTED	
203.4-R1.5	4.14	0 -103		NOT FITTED	
163.6-R2	3.37	0 -103		NOT FITTED	
141.5-R2.5	2.65	0 -103		NOT FITTED	
125.0-R3	1.61	0 -103		NOT FITTED	
109.5-R4	1.90	0 -103		NOT FITTED	
317.5-L0	4.03	0 -103		NOT FITTED	
255.3-L0.5	3.69	0 -103		NOT FITTED	
206.4-L1	2.88	0 -103		NOT FITTED	
177.0-L1.5	2.43	0 -103		NOT FITTED	
152.8-L2	1.53	0 -103		NOT FITTED	
138.7-L2.5	1.27	0 -103		NOT FITTED	
126.5-L3	1.52	0 -103		NOT FITTED	
110.9-L4	3.06	0 -103		NOT FITTED	
320.0-O1	= STOP FITTING				
320.0-O2	= STOP FITTING				
320.0-O3	= STOP FITTING				
320.0-O4	= STOP FITTING				

* SEGMENT BETWEEN 85.0 AND 15.0 PERCENT SURVIVING.


Maine cast iron (1929-1956)
ACCOUNT 331.22
ORIGINAL AND SMOOTH SURVIVOR CURVES
ORIGINAL CURVE: X 1929-2002 EXPERIENCE; 1929-1956 PLACEMENTS
IOWA 75.4-R3
PERCENT SURVIVING
AGE IN YEARS
100
90
80
70
60
50
40
30
20
10
0
10
20
30
40
50
60
70
80
90
100
110
120

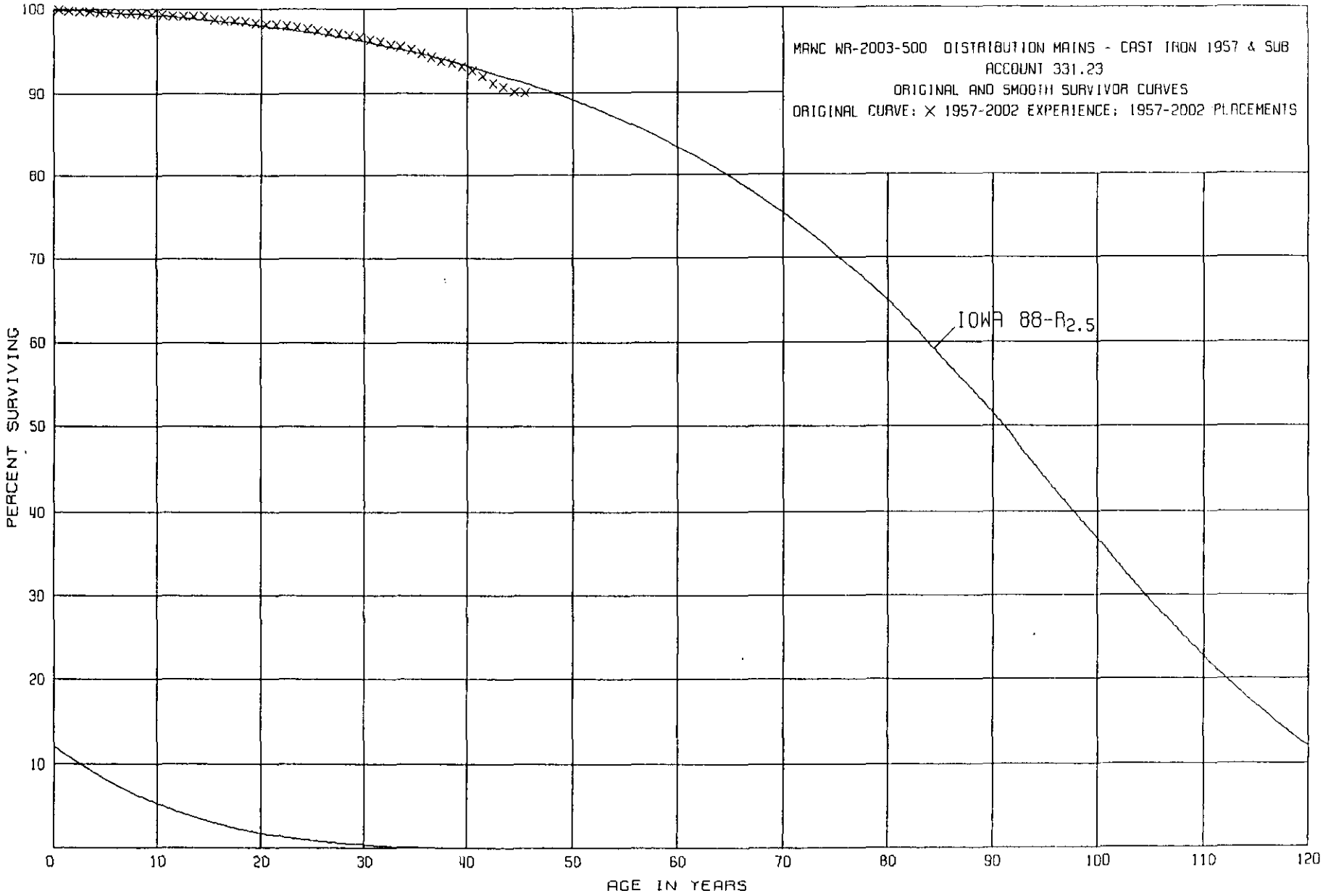
Mains cast iron (1929-1956)

ACCOUNT 331.22

SUMMARY OF CURVE FITTING RESULTS - PCT SURV BALANCED AREAS

PLACEMENT BAND 1929-1956			EXPERIENCE BAND 1929-2002		
SURVIVOR CURVE	RESID MEAS	RANGE OF FIT	SURVIVOR CURVE	RESID MEAS	RANGE OF FIT*
111.6-S0	4.39	0 - 74	NOT FITTED		
99.3-S0.5	3.46	0 - 74	NOT FITTED		
90.0-S1	2.22	0 - 74	NOT FITTED		
83.8-S1.5	1.44	0 - 74	NOT FITTED		
78.9-S2	1.52	0 - 74	NOT FITTED		
75.6-S2.5	2.51	0 - 74	NOT FITTED		
144.8-R0.5	6.46	0 - 74	NOT FITTED		
117.8-R1	5.86	0 - 74	NOT FITTED		
100.7-R1.5	4.98	0 - 74	NOT FITTED		
88.3-R2	3.56	0 - 74	NOT FITTED		
80.8-R2.5	2.38	0 - 74	NOT FITTED		
75.3-R3	1.72	0 - 74	NOT FITTED		
69.9-R4	4.52	0 - 74	NOT FITTED		
67.3-R5	9.81	0 - 74	69.4-R5	12.76	51 - 74
153.5-L0	5.47	0 - 74	NOT FITTED		
130.1-L0.5	4.68	0 - 74	NOT FITTED		
112.6-L1	3.39	0 - 74	NOT FITTED		
100.2-L1.5	2.49	0 - 74	NOT FITTED		
90.8-L2	1.25	0 - 74	NOT FITTED		
84.3-L2.5	1.48	0 - 74	NOT FITTED		
79.2-L3	2.83	0 - 74	NOT FITTED		
177.1-O1	6.74	0 - 74	NOT FITTED		
199.1-O2	6.74	0 - 74	NOT FITTED		
289.4-O3	6.81	0 - 74	NOT FITTED		

* SEGMENT BETWEEN 85.0 AND 15.0 PERCENT SURVIVING.


MAWC WR-2003-500 DISTRIBUTION MAINS - CAST IRON 1957 & SUB
ACCOUNT 331.23
ORIGINAL AND SMOOTH SURVIVOR CURVES
ORIGINAL CURVE: X 1957-2002 EXPERIENCE; 1957-2002 PLACEMENTS
IOWA 88-R2.5
PERCENT SURVIVING
AGE IN YEARS
100
90
80
70
60
50
40
30
20
10
0
10
20
30
40
50
60
70
80
90
100
110
120

MAWC WR-2003-500 DISTRIBUTION MAINS - CAST IRON 1957 & SUB

ACCOUNT 331.23

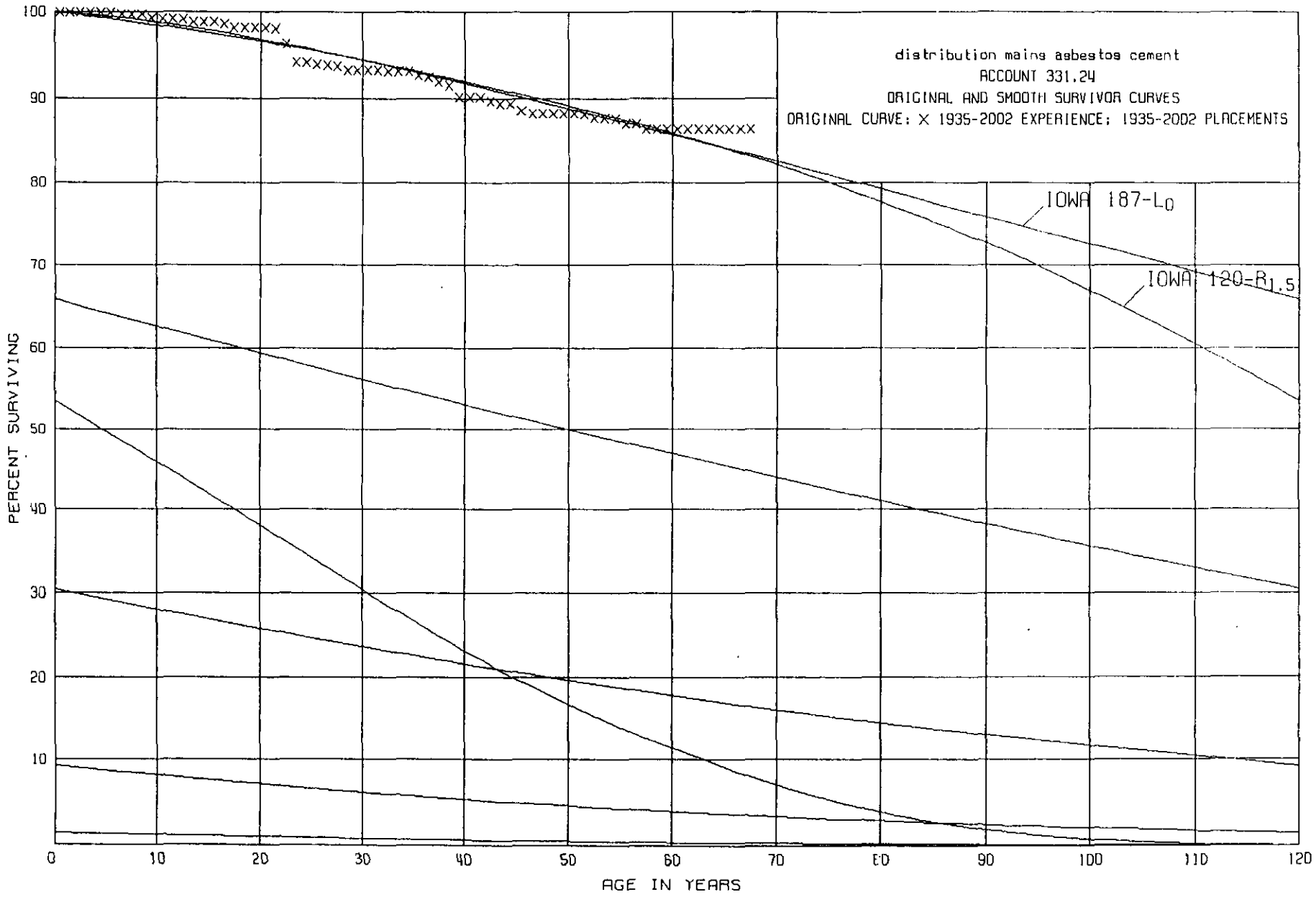
SUMMARY OF CURVE FITTING RESULTS - PCT SURV BALANCED AREAS

PLACEMENT BAND 1957-2002 EXPERIENCE BAND 1957-2002

SURVIVOR CURVE	RESID MEAS	RANGE OF FIT	SURVIVOR CURVE	RESID MEAS	RANGE OF FIT*

NOT FITTED

* SEGMENT BETWEEN 85.0 AND 15.0 PERCENT SURVIVING.



Schedule 4-58

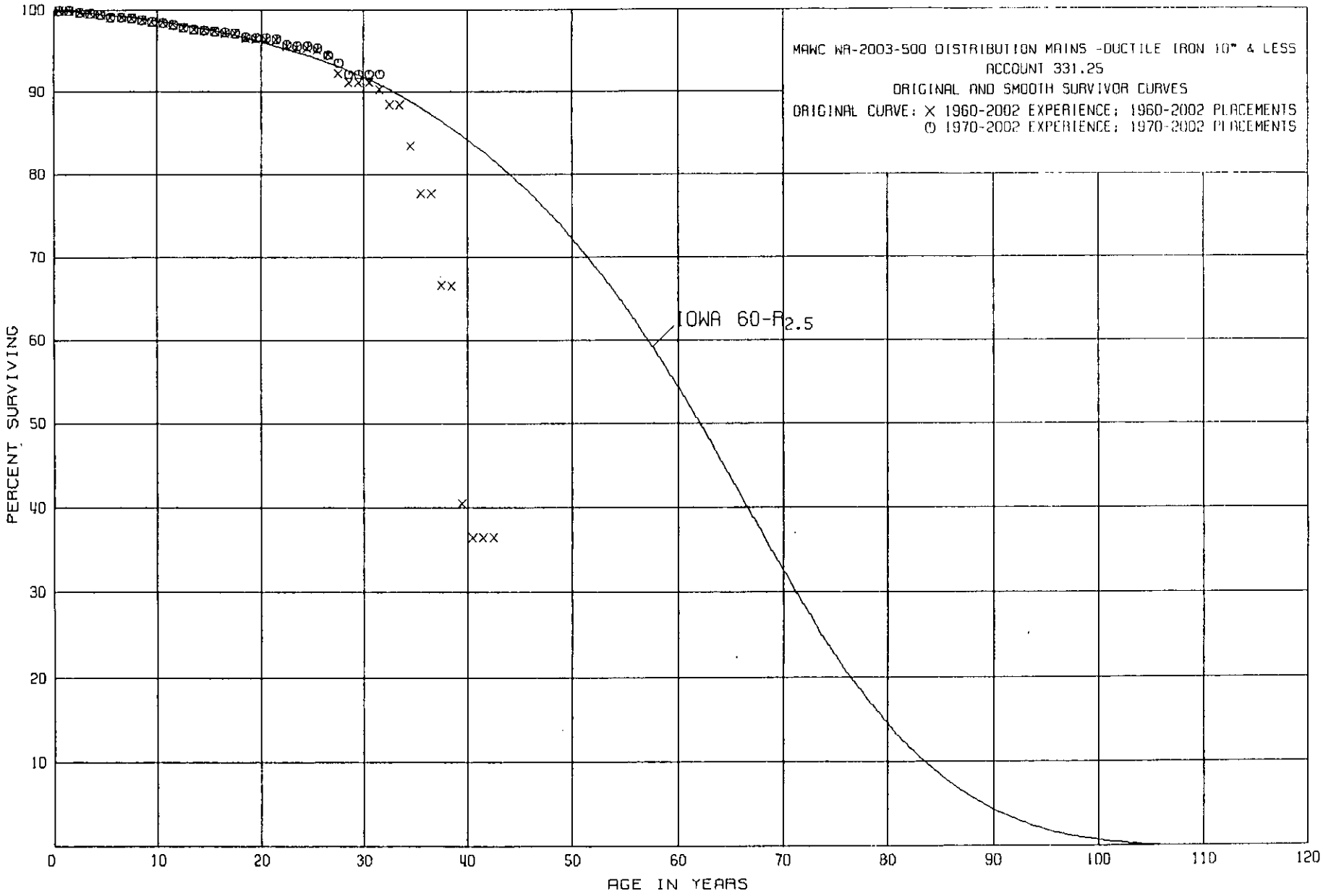
distribution mains asbestos cement

ACCOUNT 331.24

SUMMARY OF CURVE FITTING RESULTS - PCT SURV BALANCED AREAS

PLACEMENT BAND 1935-2002			EXPERIENCE BAND 1935-2002		
SURVIVOR CURVE	RESID MEAS	RANGE OF FIT	SURVIVOR CURVE	RESID MEAS	RANGE OF FIT*
124.6-S0	1.23	0 - 62		NOT FITTED	
106.4-S0.5	1.74	0 - 62		NOT FITTED	
92.1-S1	2.72	0 - 62		NOT FITTED	
188.7-R0.5	1.21	0 - 62		NOT FITTED	
145.7-R1	1.08	0 - 62		NOT FITTED	
117.0-R1.5	1.04	0 - 62		NOT FITTED	
95.2-R2	1.43	0 - 62		NOT FITTED	
82.9-R2.5	2.16	0 - 62		NOT FITTED	
182.8-L0	0.89	0 - 62		NOT FITTED	
147.8-L0.5	1.09	0 - 62		NOT FITTED	
120.5-L1	1.83	0 - 62		NOT FITTED	
237.0-O1	1.28	0 - 62		NOT FITTED	
266.5-O2	1.28	0 - 62		NOT FITTED	
320.0-O3	= STOP FITTING				
320.0-O4	= STOP FITTING				

* SEGMENT BETWEEN 85.0 AND 15.0 PERCENT SURVIVING.



Schedule 4-60

MAWC WR-2003-500 DISTRIBUTION MAINS -DUCTILE IRON 10" & LESS

ACCOUNT 331.25

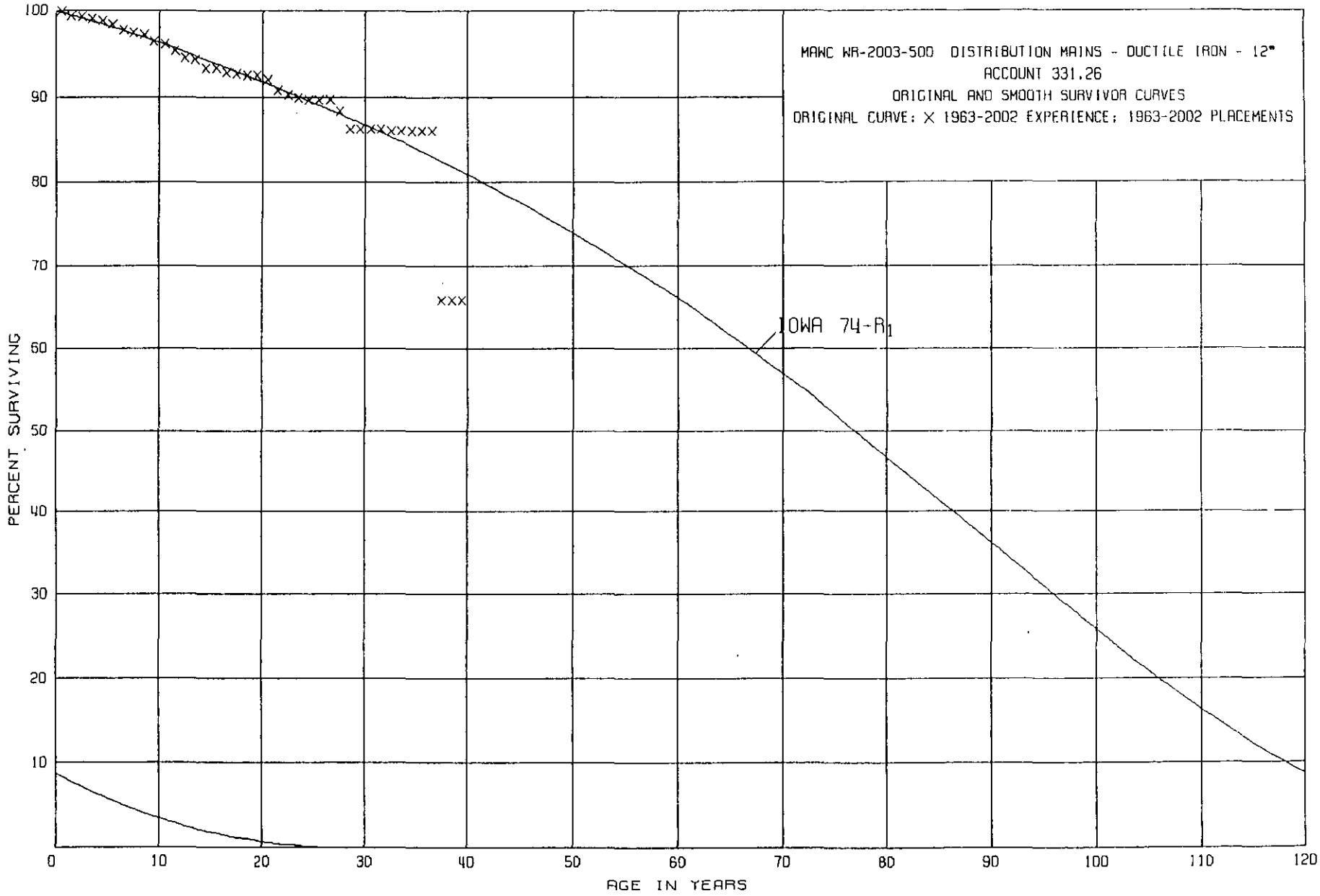
SUMMARY OF CURVE FITTING RESULTS - PCT SURV BALANCED AREAS

PLACEMENT BAND 1960-2002 1 EXPERIENCE BAND 1960-2002

SURVIVOR CURVE	RESID MEAS	RANGE OF FIT	SURVIVOR CURVE	RESID MEAS	RANGE OF FIT*

NOT FITTED

* SEGMENT BETWEEN 85.0 AND 15.0 PERCENT SURVIVING.


MAWC WR-2003-500 DISTRIBUTION MAINS - DUCTILE IRON - 12"
ACCOUNT 331.26
ORIGINAL AND SMOOTH SURVIVOR CURVES
ORIGINAL CURVE: X 1963-2002 EXPERIENCE; 1963-2002 PLACEMENTS
IOWA 74-R1
PERCENT SURVIVING
AGE IN YEARS
100
90
80
70
60
50
40
30
20
10
0
10
20
30
40
50
60
70
80
90
100
110
120

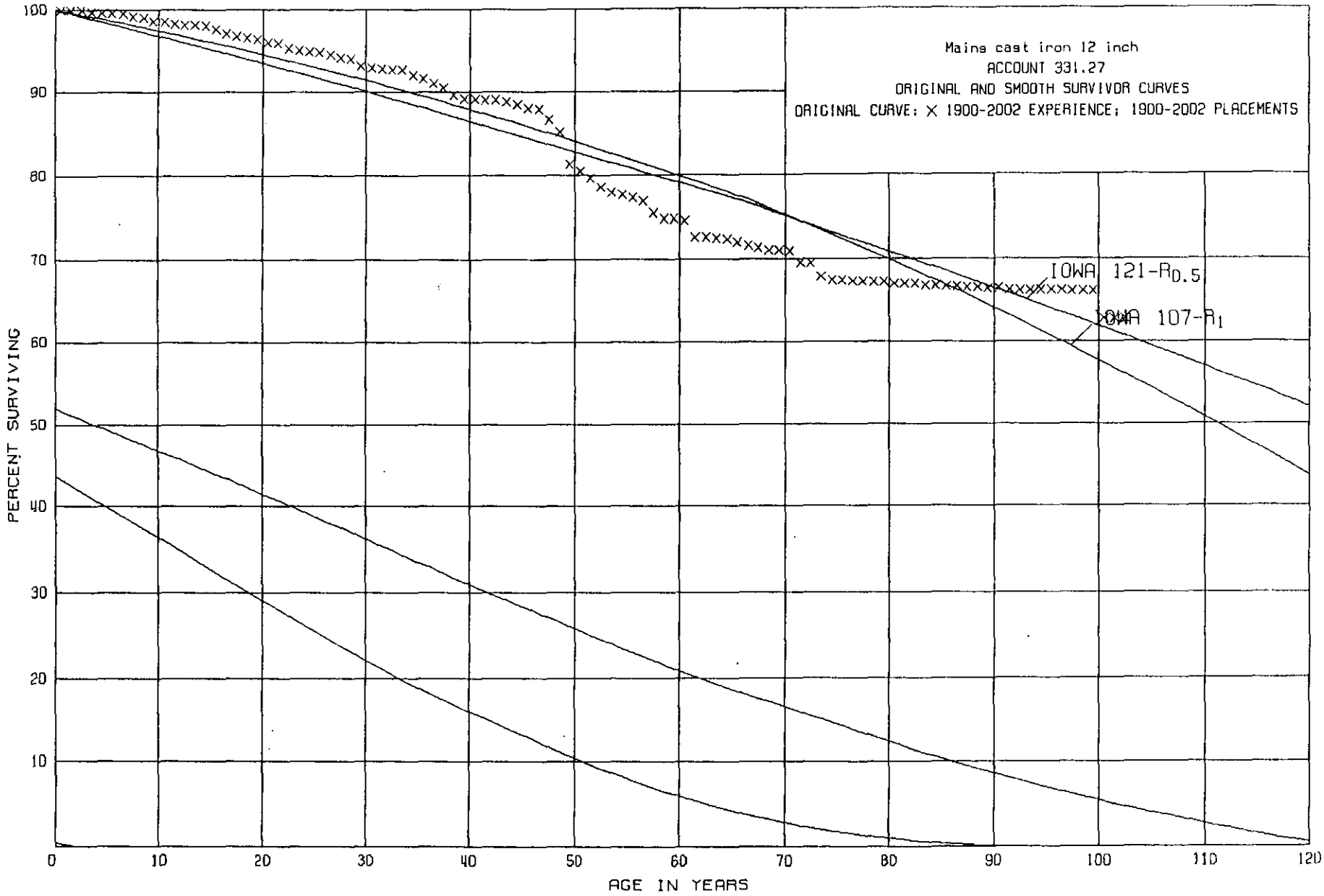
MAWC WR-2003-500 DISTRIBUTION MAINS - DUCTILE IRON - 12"

ACCOUNT 331.26

SUMMARY OF CURVE FITTING RESULTS - PCT SURV BALANCED AREAS

PLACEMENT BAND 1963-2002			EXPERIENCE BAND 1963-2002		
SURVIVOR CURVE	RESID MEAS	RANGE OF FIT	SURVIVOR CURVE	RESID MEAS	RANGE OF FIT*
62.7-S0	1.37	0 - 31		NOT FITTED	
53.5-S0.5	1.91	0 - 31		NOT FITTED	
46.3-S1	2.91	0 - 31		NOT FITTED	
95.3-R0.5	0.57	0 - 31		NOT FITTED	
73.5-R1	0.51	0 - 31		NOT FITTED	
59.0-R1.5	0.65	0 - 31		NOT FITTED	
47.9-R2	1.37	0 - 31		NOT FITTED	
92.1-L0	0.76	0 - 31		NOT FITTED	
74.4-L0.5	1.08	0 - 31		NOT FITTED	
60.6-L1	1.96	0 - 31		NOT FITTED	
119.8-O1	0.63	0 - 31		NOT FITTED	
134.7-O2	0.63	0 - 31		NOT FITTED	
197.2-O3	0.64	0 - 31		NOT FITTED	

* SEGMENT BETWEEN 85.0 AND 15.0 PERCENT SURVIVING.



Schedule 4-64

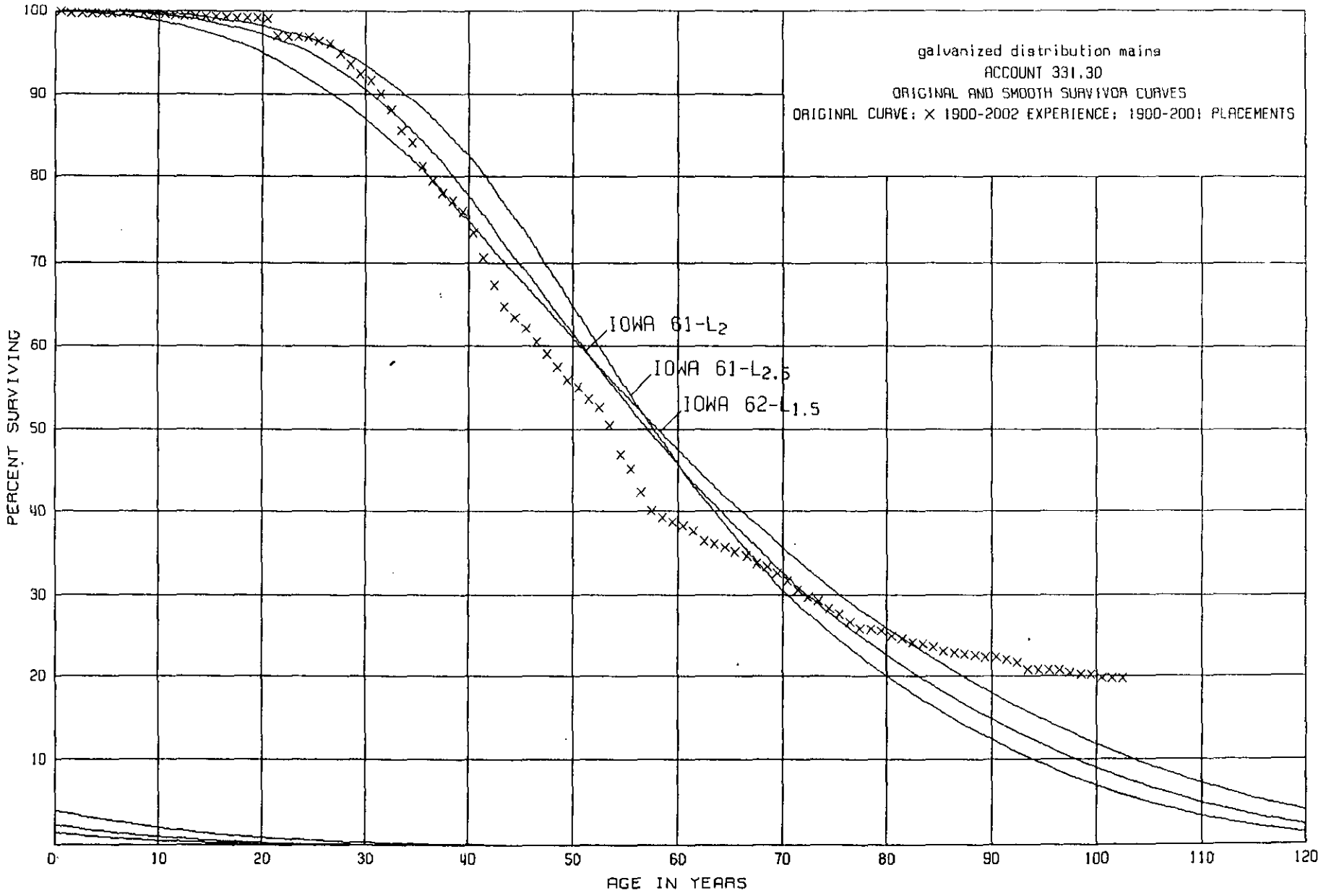
Mains cast iron 12 inch

ACCOUNT 331.27

SUMMARY OF CURVE FITTING RESULTS - PCT SURV BALANCED AREAS

PLACEMENT BAND 1900-2002			EXPERIENCE BAND 1900-2002		
SURVIVOR CURVE	RESID MEAS	RANGE OF FIT	SURVIVOR CURVE	RESID MEAS	RANGE OF FIT*
106.2-S0	3.30	0 - 98	NOT FITTED		
99.2-S0.5	4.56	0 - 98	NOT FITTED		
93.8-S1	6.27	0 - 98	NOT FITTED		
119.8-R0.5	3.23	0 - 98	NOT FITTED		
105.2-R1	3.26	0 - 98	NOT FITTED		
96.7-R1.5	4.22	0 - 98	NOT FITTED		
135.0-L0	2.57	0 - 98	NOT FITTED		
121.2-L0.5	2.87	0 - 98	NOT FITTED		
110.8-L1	3.87	0 - 98	NOT FITTED		
139.3-O1	3.52	0 - 98	NOT FITTED		
156.7-O2	3.52	0 - 98	NOT FITTED		
223.6-O3	3.66	0 - 98	NOT FITTED		

* SEGMENT BETWEEN 85.0 AND 15.0 PERCENT SURVIVING.


galvanized distribution mains
ACCOUNT 331.30
ORIGINAL AND SMOOTH SURVIVOR CURVES
ORIGINAL CURVE: X 1900-2002 EXPERIENCE; 1900-2001 PLACEMENTS
IOWA 61-L2
IOWA 61-L2.5
IOWA 62-L1.5
PERCENT SURVIVING
AGE IN YEARS
100
90
80
70
60
50
40
30
20
10
0
10
20
30
40
50
60
70
80
90
100
110
120

galvanized distribution mains

ACCOUNT 331.30

SUMMARY OF CURVE FITTING RESULTS - PCT SURV BALANCED AREAS

PLACEMENT BAND 1900-2001			EXPERIENCE BAND 1900-2002		
SURVIVOR CURVE	RESID MEAS	RANGE OF FIT	SURVIVOR CURVE	RESID MEAS	RANGE OF FIT*
60.7-S0	6.91	0 -103	58.5-S0	6.82	34 -103
60.5-S0.5	6.94	0 -103	59.2-S0.5	7.79	34 -103
60.3-S1	7.70	0 -103	59.7-S1	9.24	34 -103
61.1-R0.5	8.61	0 -103	57.3-R0.5	6.80	34 -103
60.4-R1	8.46	0 -103	58.0-R1	8.59	34 -103
60.3-R1.5	8.97	0 -103	58.7-R1.5	10.12	34 -103
60.2-R2	10.23	0 -103	59.3-R2	12.20	34 -103
65.4-L0	8.22	0 -103	60.2-L0	5.21	34 -103
63.8-L0.5	6.65	0 -103	60.2-L0.5	4.71	34 -103
62.4-L1	5.41	0 -103	60.2-L1	4.72	34 -103
61.8-L1.5	4.74	0 -103	60.6-L1.5	5.03	34 -103
61.2-L2	5.14	0 -103	60.9-L2	6.18	34 -103
60.8-L2.5	6.87	0 -103	61.0-L2.5	8.40	34 -103
61.9-O1	9.89	0 -103	56.4-O1	6.44	34 -103
68.7-O2	9.88	0 -103	61.5-O2	5.59	34 -103
85.5-O3	12.09	0 -103	71.3-O3	8.19	34 -103

* SEGMENT BETWEEN 85.0 AND 15.0 PERCENT SURVIVING.

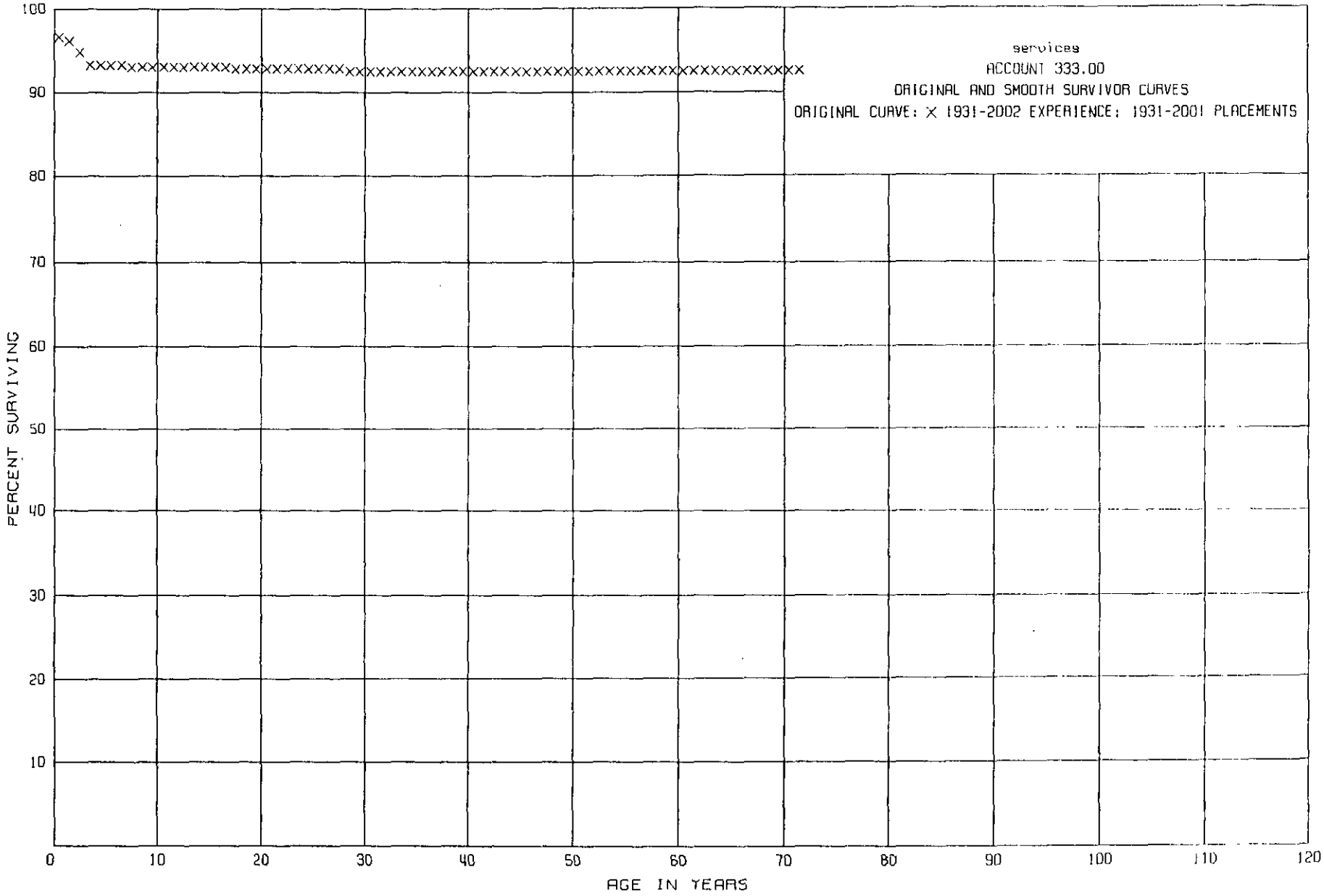
Account 345

(MAWC Account 333.00)

Services

ITEMS

- Corporation Stops or Tees
- Gate Valves and boxes
- Goose Necks
- Jointing and Jointing Materials
- Municipal Inspection or Permits
- Pavement Disturbed
- Pipes
- Placing Pipes and Accessories
- Protection of Street Openings
- Service or Curb Boxes
- Service or Curb Stops
- Tapping Main



Schedule 4-70

services

ACCOUNT 333.00

SUMMARY OF CURVE FITTING RESULTS - PCT SURV BALANCED AREAS

PLACEMENT BAND 1931-2001 EXPERIENCE BAND 1931-2002

SURVIVOR CURVE	RESID MEAS	RANGE OF FIT	SURVIVOR CURVE	RESID MEAS	RANGE OF FIT*

NOT FITTED

* SEGMENT BETWEEN 85.0 AND 15.0 PERCENT SURVIVING.

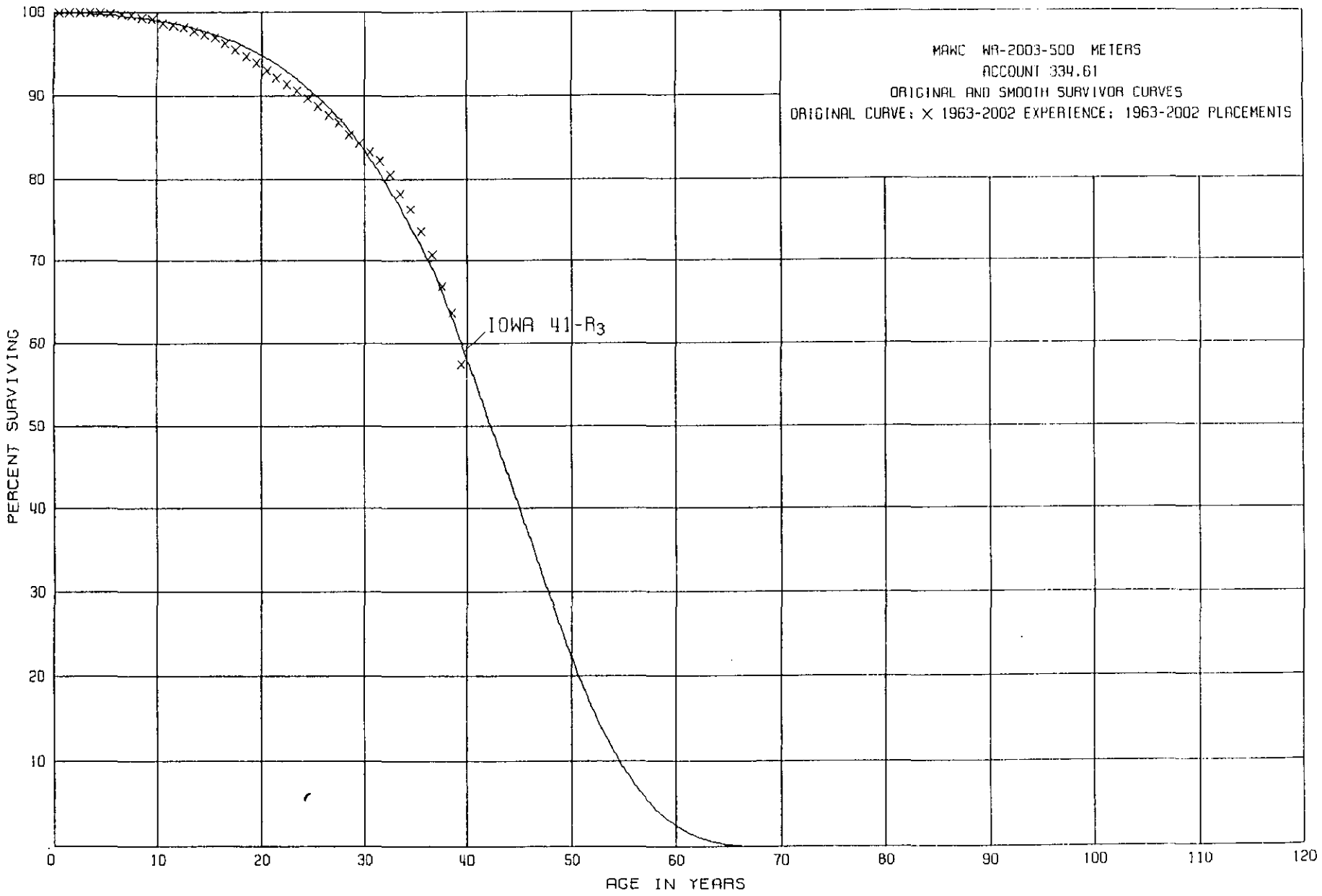
Account 346

(MAWC Account 334.61&334.62)

Meters

ITEMS

- Meters including badging and initial testing
- Remote Meter Registers


MAWC WR-2003-500 METERS
ACCOUNT 334.61
ORIGINAL AND SMOOTH SURVIVOR CURVES
ORIGINAL CURVE: X 1963-2002 EXPERIENCE: 1963-2002 PLACEMENTS
IOWA 41-R3
PERCENT SURVIVING
AGE IN YEARS
100
90
80
70
60
50
40
30
20
10
0
10
20
30
40
50
60
70
80
90
100
110
120

MAWC WR-2003-500 METERS

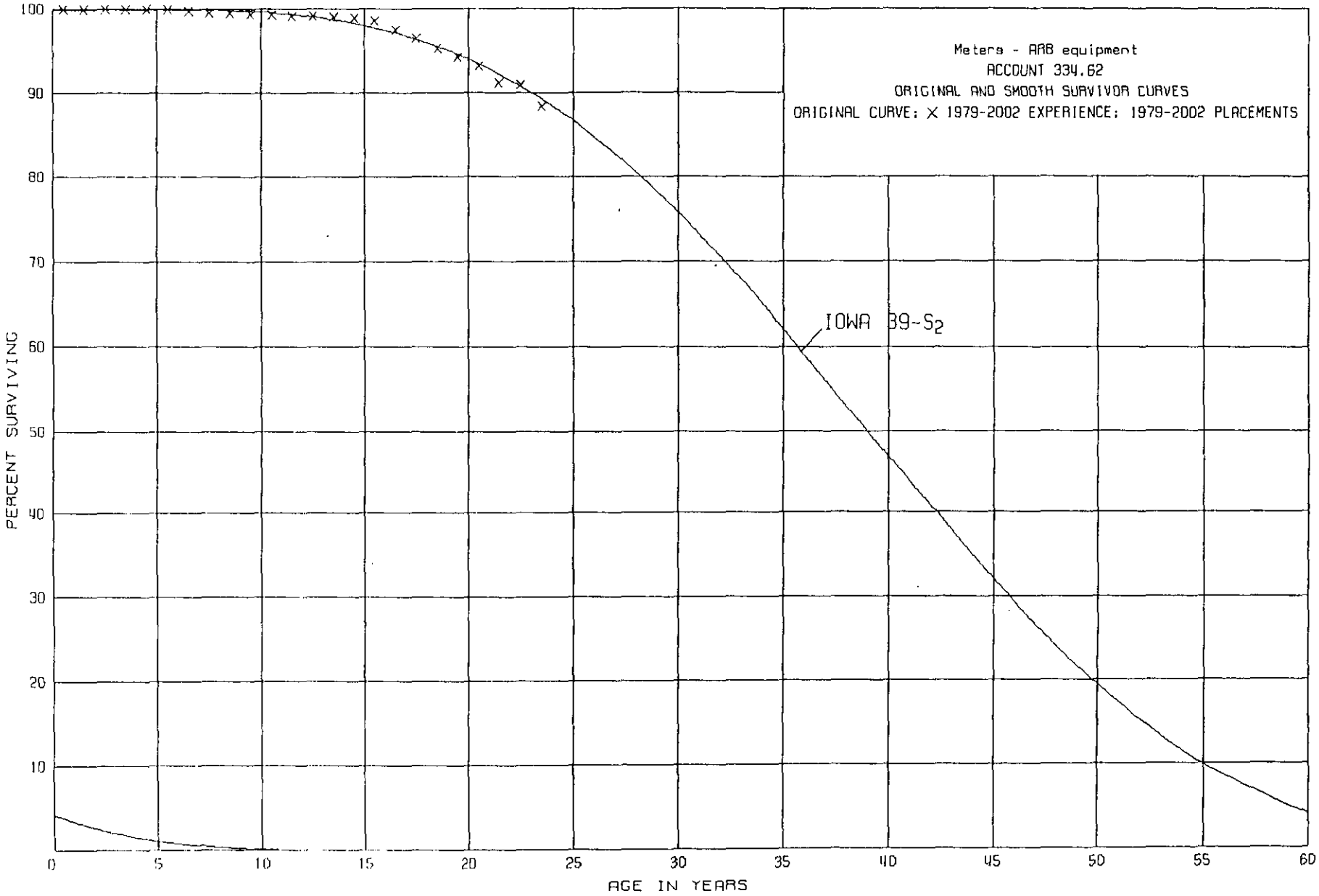
ACCOUNT 334.61

SUMMARY OF CURVE FITTING RESULTS - PCT SURV BALANCED AREAS

PLACEMENT BAND 1963-2002 2 EXPERIENCE BAND 1963-2002

SURVIVOR CURVE	RESID MEAS	RANGE OF FIT	SURVIVOR CURVE	RESID MEAS	RANGE OF FIT*
60.7-S0	3.90	0 - 40	NOT FITTED		
54.0-S0.5	3.03	0 - 40	NOT FITTED		
48.9-S1	2.00	0 - 40	NOT FITTED		
45.5-S1.5	1.46	0 - 40	NOT FITTED		
42.8-S2	1.98	0 - 40	NOT FITTED		
41.0-S2.5	2.82	0 - 40	NOT FITTED		
79.1-R0.5	5.88	0 - 40	NOT FITTED		
64.2-R1	5.28	0 - 40	NOT FITTED		
54.8-R1.5	4.41	0 - 40	NOT FITTED		
48.0-R2	3.00	0 - 40	NOT FITTED		
43.9-R2.5	1.72	0 - 40	NOT FITTED		
40.9-R3	1.09	0 - 40	NOT FITTED		
37.9-R4	4.20	0 - 40	NOT FITTED		
36.4-R5	9.39	0 - 40	NOT FITTED		
83.7-L0	4.92	0 - 40	NOT FITTED		
70.8-L0.5	4.17	0 - 40	NOT FITTED		
61.2-L1	3.03	0 - 40	NOT FITTED		
54.4-L1.5	2.19	0 - 40	NOT FITTED		
49.3-L2	1.52	0 - 40	NOT FITTED		
45.8-L2.5	1.69	0 - 40	NOT FITTED		
42.9-L3	3.11	0 - 40	NOT FITTED		
96.8-O1	6.15	0 - 40	NOT FITTED		
108.8-O2	6.14	0 - 40	NOT FITTED		
158.2-O3	6.21	0 - 40	NOT FITTED		

* SEGMENT BETWEEN 85.0 AND 15.0 PERCENT SURVIVING.



Schedule 4-76

Meters - ARB equipment

ACCOUNT 334.62

SUMMARY OF CURVE FITTING RESULTS - PCT SURV BALANCED AREAS

PLACEMENT BAND 1979-2002			EXPERIENCE BAND 1979-2002		
SURVIVOR CURVE	RESID MEAS	RANGE OF FIT	SURVIVOR CURVE	RESID MEAS	RANGE OF FIT*

NOT FITTED

* SEGMENT BETWEEN 85.0 AND 15.0 PERCENT SURVIVING.

Max years - 34

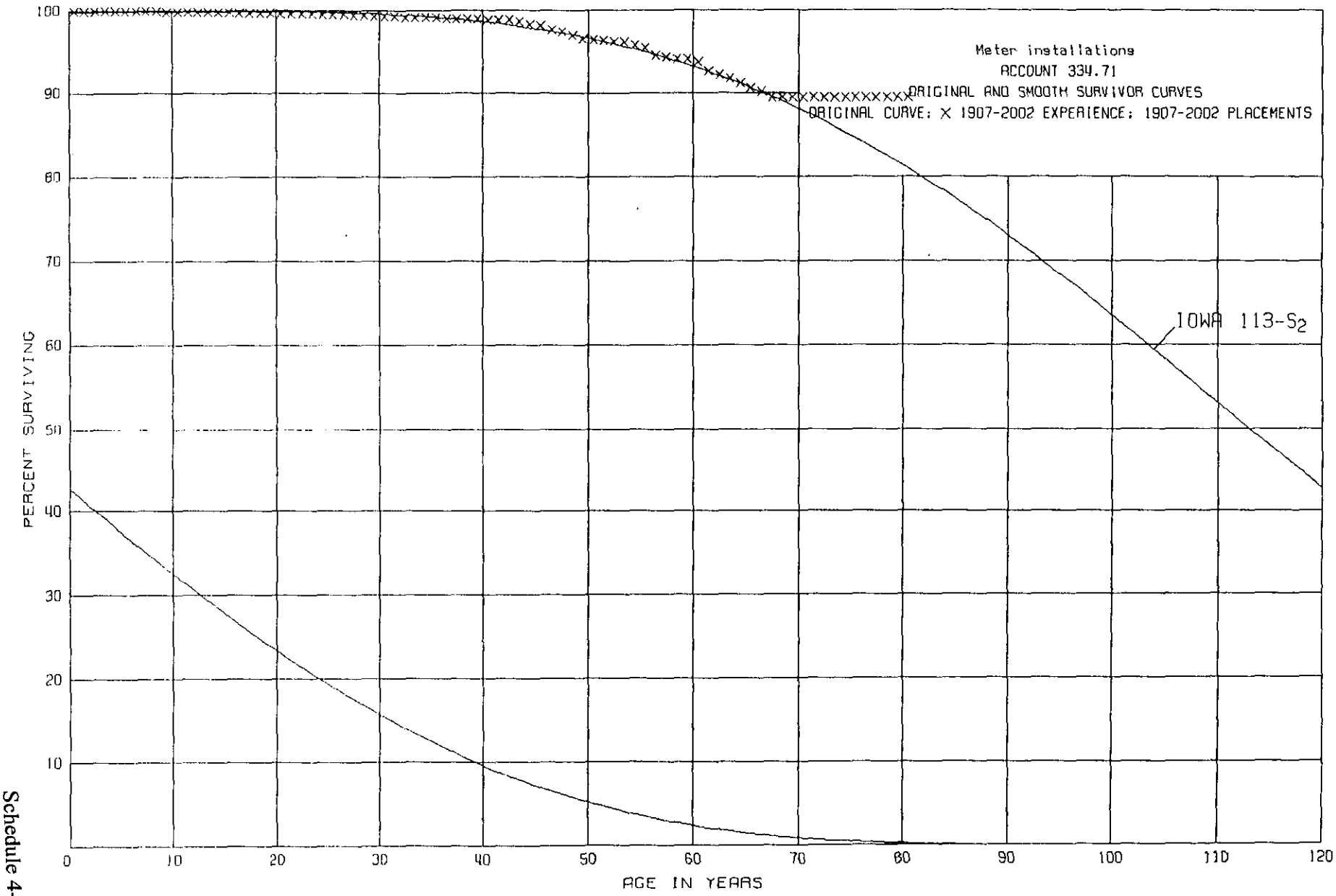
Account 347

(MAWC Account 334.71&334.72)

Meter Installations

ITEMS

- Installation Labor
- Meter Coupling
- Meter Bars
- Meter Yokes
- Meter Fittings, Connections and Shelves
- Meter Vaults or Boxes
- Stops



Schedule 4-80

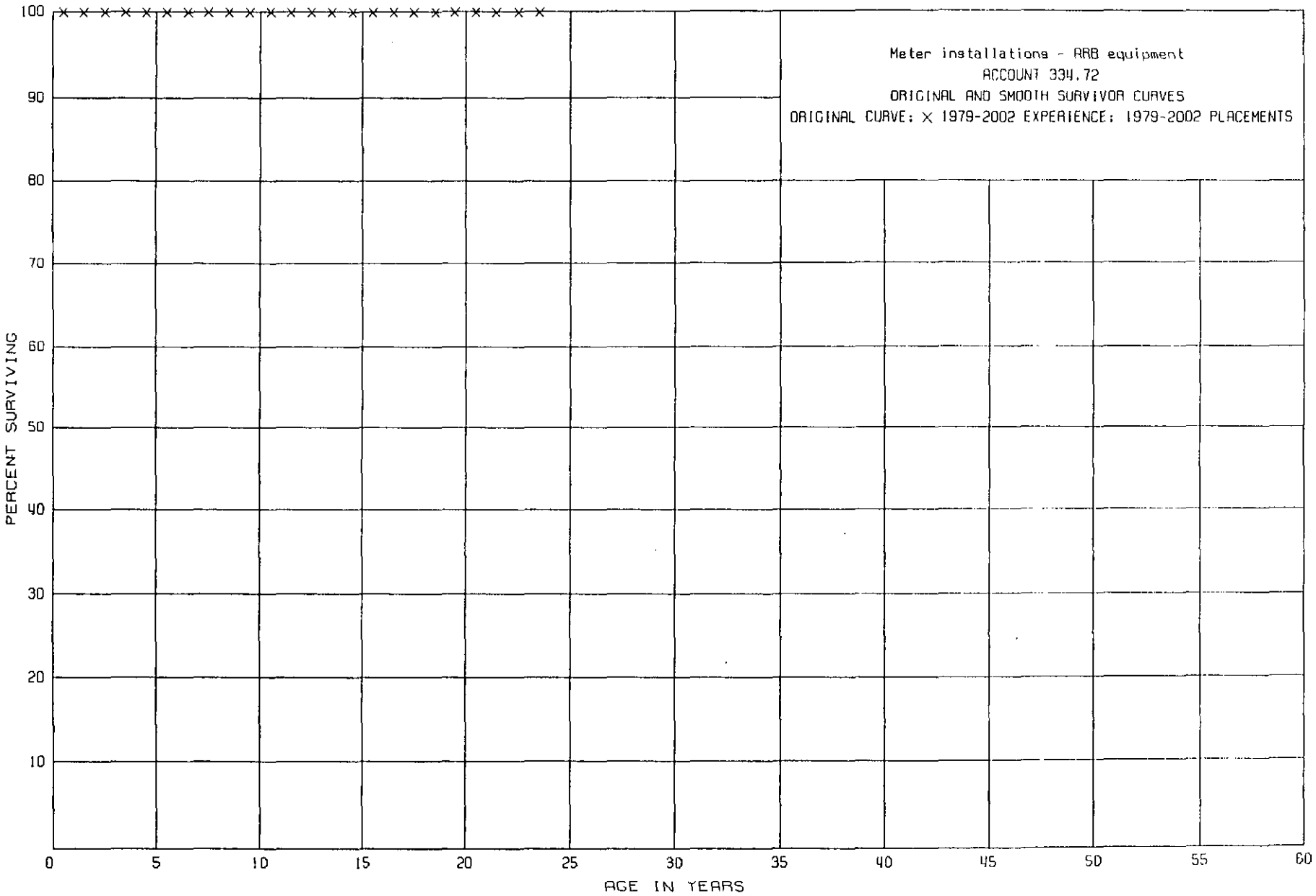
Meter installations

ACCOUNT 334.71

SUMMARY OF CURVE FITTING RESULTS - PCT SURV BALANCED AREAS

PLACEMENT BAND 1907-2002			EXPERIENCE BAND 1907-2002		
SURVIVOR CURVE	RESID MEAS	RANGE OF FIT	SURVIVOR CURVE	RESID MEAS	RANGE OF FIT*
238.8-S0	1.47	0 - 75		NOT FITTED	
191.8-S0.5	1.26	0 - 75		NOT FITTED	
152.3-S1	0.76	0 - 75		NOT FITTED	
132.6-S1.5	0.58	0 - 75		NOT FITTED	
115.1-S2	0.65	0 - 75		NOT FITTED	
105.6-S2.5	0.92	0 - 75		NOT FITTED	
320.0-R0.5	= STOP FITTING				
320.0-R1	= STOP FITTING				
260.8-R1.5	2.01	0 - 75		NOT FITTED	
185.3-R2	1.73	0 - 75		NOT FITTED	
146.8-R2.5	1.41	0 - 75		NOT FITTED	
117.3-R3	0.78	0 - 75		NOT FITTED	
93.4-R4	1.12	0 - 75		NOT FITTED	
320.0-L0	= STOP FITTING				
297.2-L0.5	1.70	0 - 75		NOT FITTED	
216.3-L1	1.30	0 - 75		NOT FITTED	
177.4-L1.5	1.08	0 - 75		NOT FITTED	
141.8-L2	0.65	0 - 75		NOT FITTED	
125.4-L2.5	0.57	0 - 75		NOT FITTED	
109.3-L3	0.91	0 - 75		NOT FITTED	
320.0-O1	= STOP FITTING				
320.0-O2	= STOP FITTING				
320.0-O3	= STOP FITTING				
320.0-O4	= STOP FITTING				

* SEGMENT BETWEEN 85.0 AND 15.0 PERCENT SURVIVING.


Meter installations - RRB equipment
ACCOUNT 334.72
ORIGINAL AND SMOOTH SURVIVOR CURVES
ORIGINAL CURVE: X 1979-2002 EXPERIENCE: 1979-2002 PLACEMENTS
PERCENT SURVIVING
100
90
80
70
60
50
40
30
20
10
0
5
10
15
20
25
30
35
40
45
50
55
60
AGE IN YEARS

Meter installations - ARB equipment

ACCOUNT 334.72

SUMMARY OF CURVE FITTING RESULTS - PCT SURV BALANCED AREAS

PLACEMENT BAND 1979-2002			EXPERIENCE BAND 1979-2002		
SURVIVOR CURVE	RESID MEAS	RANGE OF FIT	SURVIVOR CURVE	RESID MEAS	RANGE OF FIT*

NOT FITTED

* SEGMENT BETWEEN 85.0 AND 15.0 PERCENT SURVIVING.

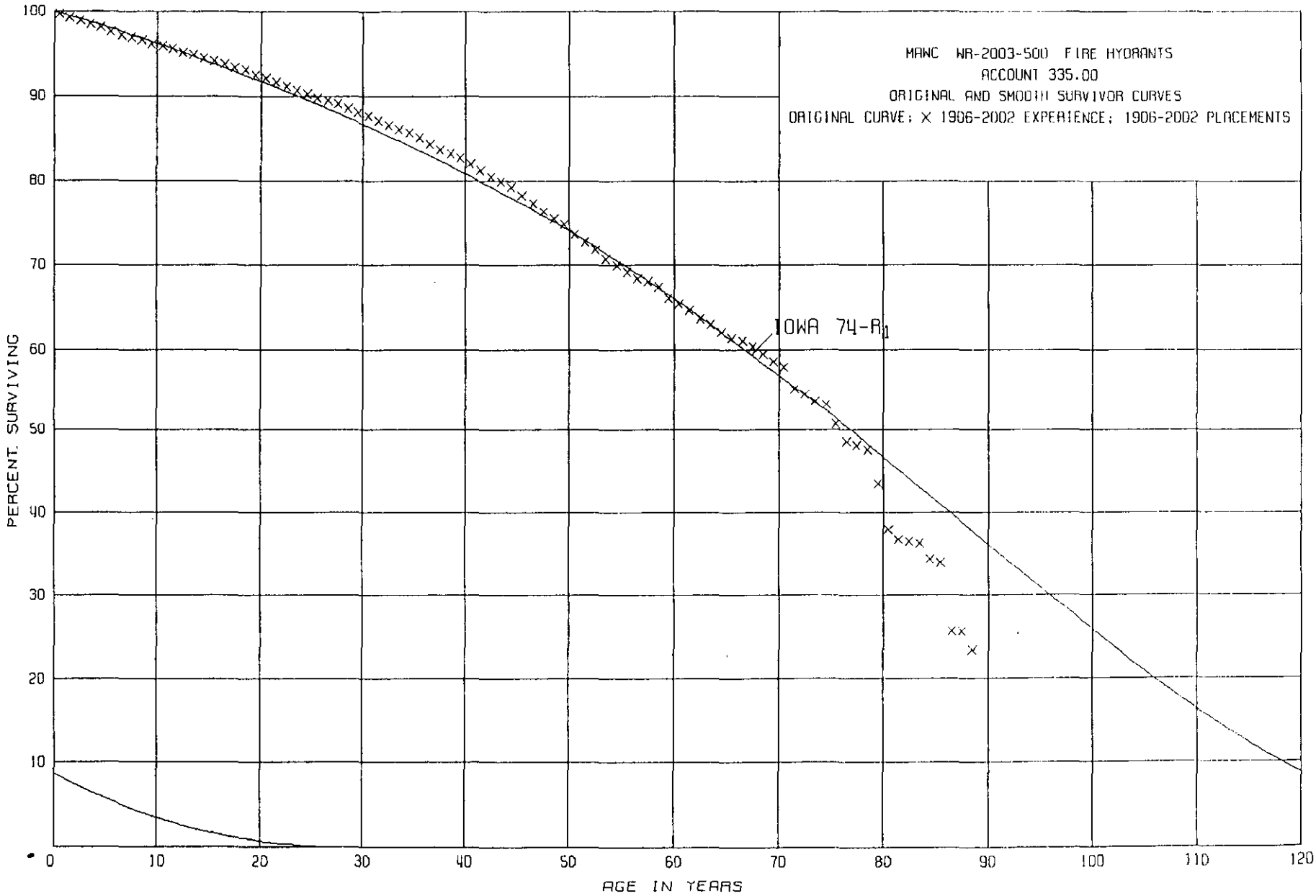
Account 348

(MAWC Account 335.00)

Hydrants

ITEMS

- Connections to Main
- Excavation, Backfill and Disposal of Excess Excavated Material
- Hydrants and Fittings
- Manholes
- Pavement Disturbed
- Pipe including leads and drains
- Tee at Main
- Valves and Valve Boxes


MAWC WR-2003-500 FIRE HYDRANTS
ACCOUNT 335.00
ORIGINAL AND SMOOTH SURVIVOR CURVES
ORIGINAL CURVE: X 1906-2002 EXPERIENCE; 1906-2002 PLACEMENTS
IOWA 74-R1
PERCENT SURVIVING
AGE IN YEARS
100
90
80
70
60
50
40
30
20
10
0
0
10
20
30
40
50
60
70
80
90
100
110
120

MAWC WR-2003-500 FIRE HYDRANTS

ACCOUNT 335.00

SUMMARY OF CURVE FITTING RESULTS - PCT SURV BALANCED AREAS

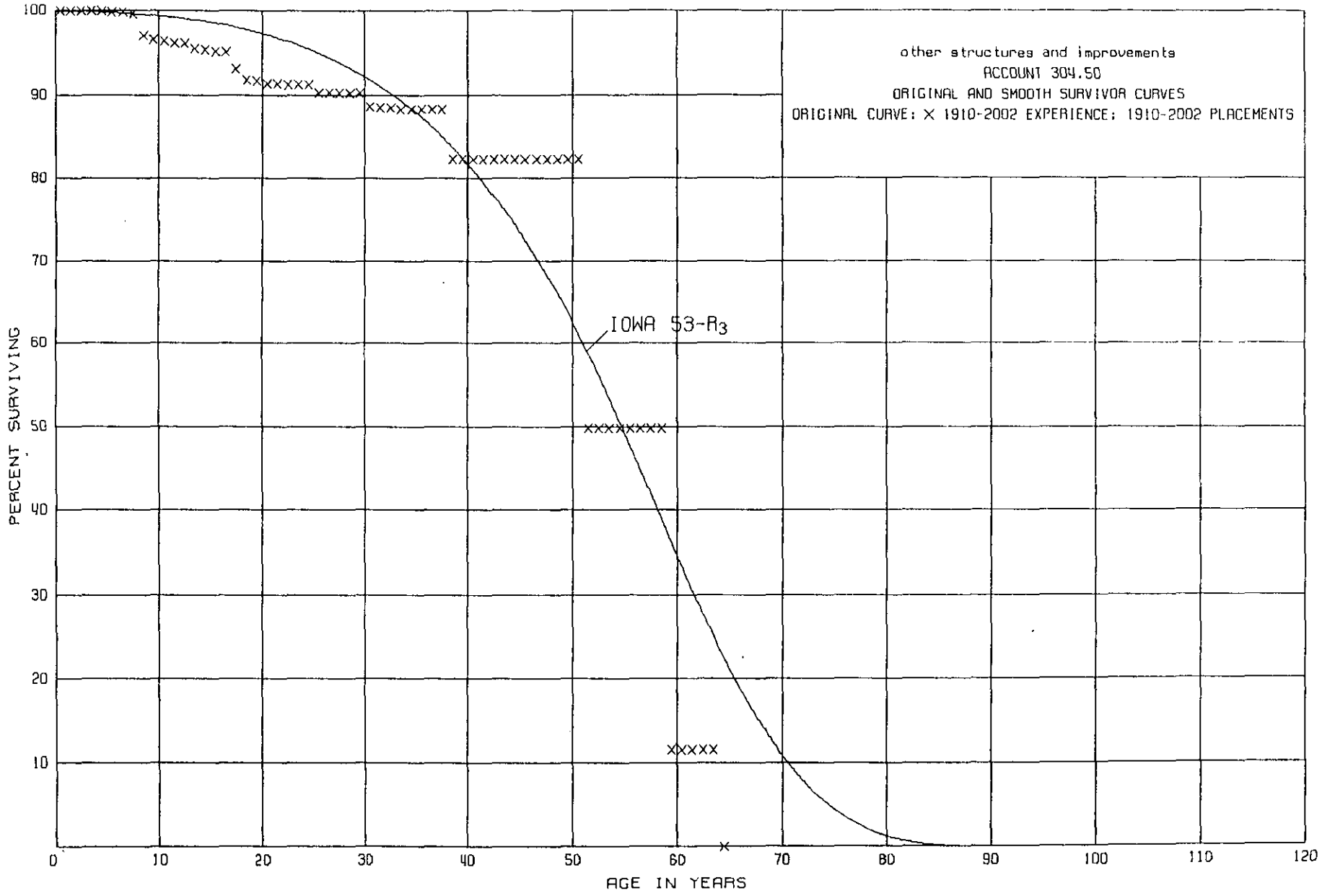
PLACEMENT BAND 1906-2002			EXPERIENCE BAND 1906-2002		
SURVIVOR CURVE	RESID MEAS	RANGE OF FIT	SURVIVOR CURVE	RESID MEAS	RANGE OF FIT*
74.5-S0	1.56	0 - 54	NOT FITTED		
67.2-S0.5	2.52	0 - 54	NOT FITTED		
61.6-S1	4.02	0 - 54	NOT FITTED		
92.6-R0.5	1.32	0 - 54	NOT FITTED		
76.8-R1	0.64	0 - 54	NOT FITTED		
67.0-R1.5	0.82	0 - 54	NOT FITTED		
60.0-R2	2.45	0 - 54	NOT FITTED		
100.4-L0	0.90	0 - 54	NOT FITTED		
86.4-L0.5	1.22	0 - 54	NOT FITTED		
76.0-L1	2.53	0 - 54	NOT FITTED		
112.0-O1	1.68	0 - 54	NOT FITTED		
126.0-O2	1.68	0 - 54	NOT FITTED		
182.5-O3	1.78	0 - 54	NOT FITTED		

* SEGMENT BETWEEN 85.0 AND 15.0 PERCENT SURVIVING.

Account 390

(MAWC Account 304.50)

Structures and Improvements – General Plant



Schedule 4-90

other structures and improvements

ACCOUNT 304.50

SUMMARY OF CURVE FITTING RESULTS - PCT SURV BALANCED AREAS

PLACEMENT BAND 1910-2002			EXPERIENCE BAND 1910-2002		
SURVIVOR CURVE	RESID MEAS	RANGE OF FIT	SURVIVOR CURVE	RESID MEAS	RANGE OF FIT*
79.1-S0	1.83	0 - 46		NOT FITTED	
69.1-S0.5	2.46	0 - 46		NOT FITTED	
61.3-S1	3.62	0 - 46		NOT FITTED	
109.9-R0.5	1.32	0 - 46		NOT FITTED	
87.1-R1	1.21	0 - 46		NOT FITTED	
72.3-R1.5	1.32	0 - 46		NOT FITTED	
61.4-R2	2.11	0 - 46		NOT FITTED	
112.1-L0	1.28	0 - 46		NOT FITTED	
92.9-L0.5	1.59	0 - 46		NOT FITTED	
78.3-L1	2.55	0 - 46		NOT FITTED	
136.2-O1	1.40	0 - 46		NOT FITTED	
153.1-O2	1.40	0 - 46		NOT FITTED	
223.5-O3	1.43	0 - 46		NOT FITTED	

* SEGMENT BETWEEN 85.0 AND 15.0 PERCENT SURVIVING.

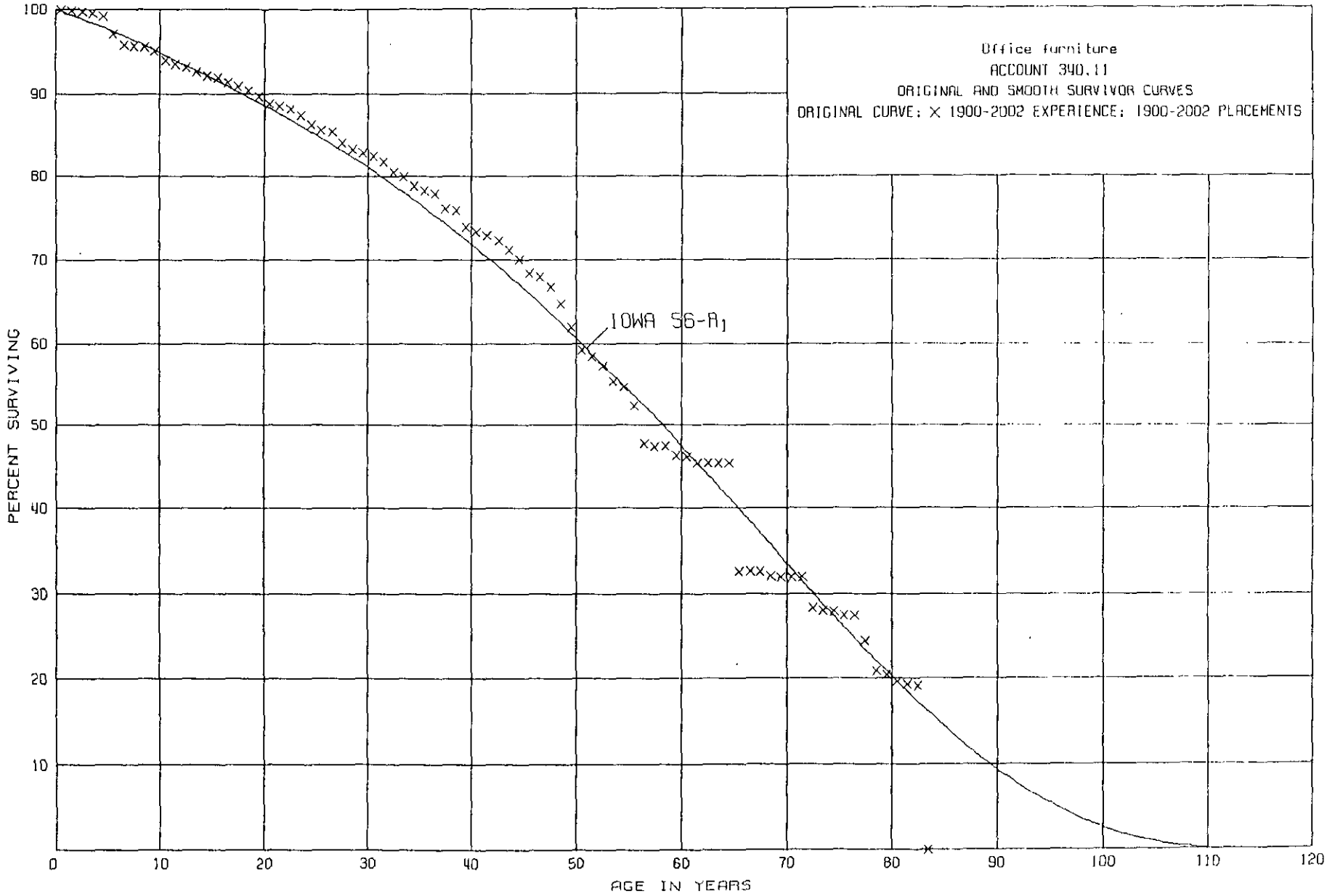
Account 391

(MAWC Account 340.11&340.12)

Office Furniture and Equipment

ITEMS

- Book Cases and Shelves
- Desks, Chairs, and Desk Equipment
- Drafting Room Equipment
- Electronic Data Processing Equipment
- Filing, Storage, and Other Cabinets
- Floor Covering
- Library and Library Equipment
- Mechanical Office Equipment
- Safes
- Tables



Schedule 4-94

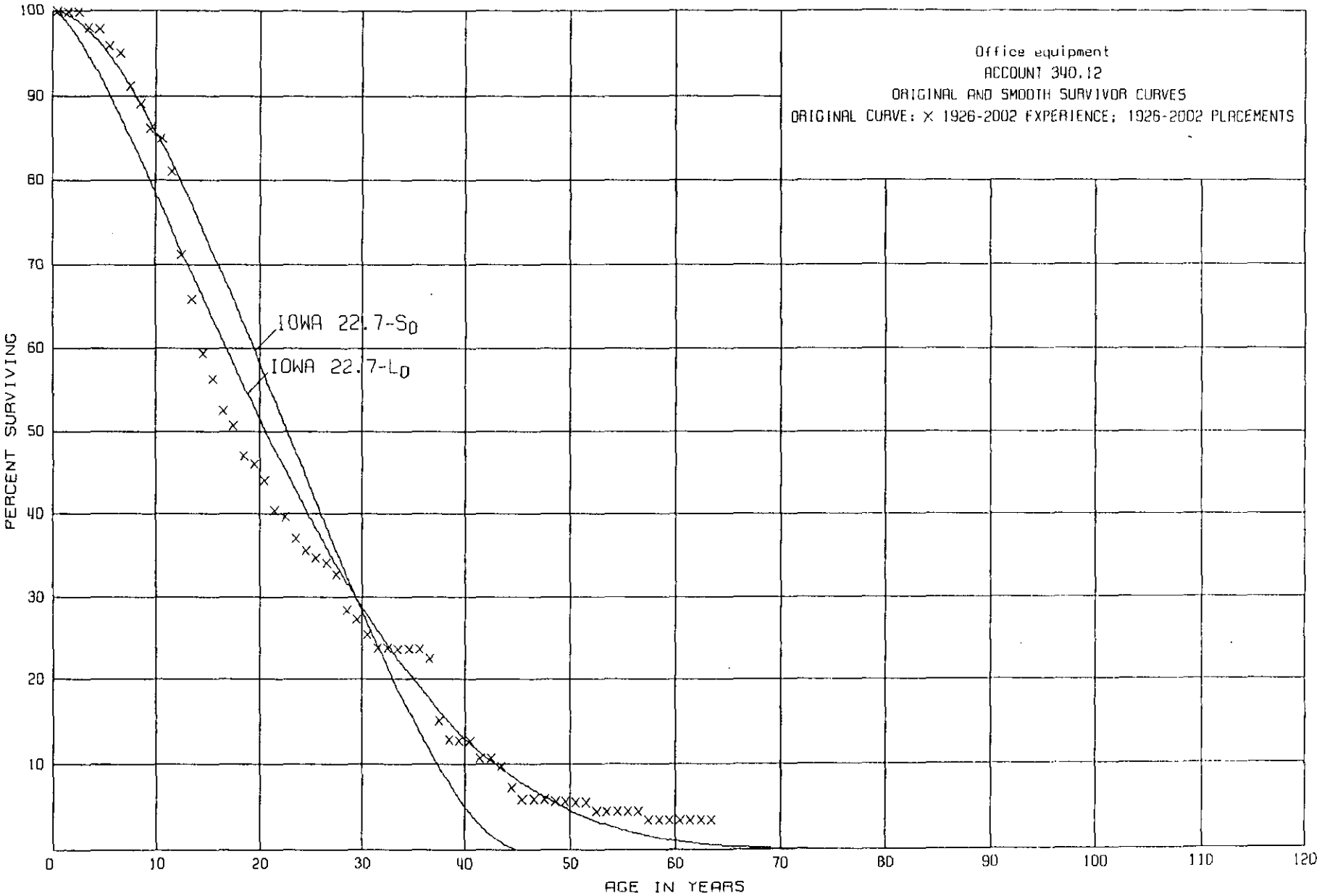
Office furniture

ACCOUNT 340.11

SUMMARY OF CURVE FITTING RESULTS - PCT SURV BALANCED AREAS

PLACEMENT BAND 1900-2002			EXPERIENCE BAND 1900-2002		
SURVIVOR CURVE	RESID MEAS	RANGE OF FIT	SURVIVOR CURVE	RESID MEAS	RANGE OF FIT*
58.1-S0	1.99	0 - 44	NOT FITTED		
52.7-S0.5	3.14	0 - 44	NOT FITTED		
48.6-S1	4.75	0 - 44	53.3-S1	2.64	27 - 44
70.8-R0.5	0.91	0 - 44	NOT FITTED		
59.3-R1	0.52	0 - 44	NOT FITTED		
52.2-R1.5	1.52	0 - 44	54.1-R1.5	1.04	27 - 44
47.2-R2	3.31	0 - 44	50.2-R2	2.24	27 - 44
77.5-L0	0.85	0 - 44	NOT FITTED		
67.2-L0.5	1.62	0 - 44	NOT FITTED		
59.6-L1	3.06	0 - 44	NOT FITTED		
85.1-O1	1.29	0 - 44	NOT FITTED		
95.7-O2	1.29	0 - 44	NOT FITTED		
138.4-O3	1.42	0 - 44	NOT FITTED		

* SEGMENT BETWEEN 85.0 AND 15.0 PERCENT SURVIVING.


Office equipment
ACCOUNT 340.12
ORIGINAL AND SMOOTH SURVIVOR CURVES
ORIGINAL CURVE: X 1926-2002 EXPERIENCE; 1926-2002 PLACEMENTS
IOWA 22.7-S0
IOWA 22.7-L0
PERCENT SURVIVING
AGE IN YEARS
100
90
80
70
60
50
40
30
20
10
0
10
20
30
40
50
60
70
80
90
100
110
120

Office equipment

ACCOUNT 340.12

SUMMARY OF CURVE FITTING RESULTS - PCT SURV BALANCED AREAS

PLACEMENT BAND 1926-2002			EXPERIENCE BAND 1926-2002		
SURVIVOR CURVE	RESID MEAS	RANGE OF FIT	SURVIVOR CURVE	RESID MEAS	RANGE OF FIT*
19.4-S0	4.49	0 - 27	18.9-S0	5.31	11 - 27
19.1-S0.5	5.34	0 - 27	18.9-S0.5	6.97	11 - 27
18.8-S1	6.92	0 - 27	18.9-S1	8.84	11 - 27
19.9-R0.5	5.99	0 - 27	18.6-R0.5	4.81	11 - 27
19.1-R1	5.84	0 - 27	18.5-R1	6.85	11 - 27
18.8-R1.5	7.08	0 - 27	18.5-R1.5	9.24	11 - 27
18.5-R2	9.12	0 - 27	18.5-R2	11.81	11 - 27
22.1-L0	5.38	0 - 27	20.6-L0	3.42	11 - 27
21.1-L0.5	4.09	0 - 27	20.2-L0.5	3.52	11 - 27
20.3-L1	3.50	0 - 27	19.9-L1	4.16	11 - 27
19.8-L1.5	4.44	0 - 27	19.8-L1.5	5.73	11 - 27
19.4-L2	6.20	0 - 27	19.7-L2	7.66	11 - 27
21.0-O1	7.20	0 - 27	18.9-O1	3.92	11 - 27
23.6-O2	7.22	0 - 27	21.1-O2	3.81	11 - 27

* SEGMENT BETWEEN 85.0 AND 15.0 PERCENT SURVIVING.

max. age 64

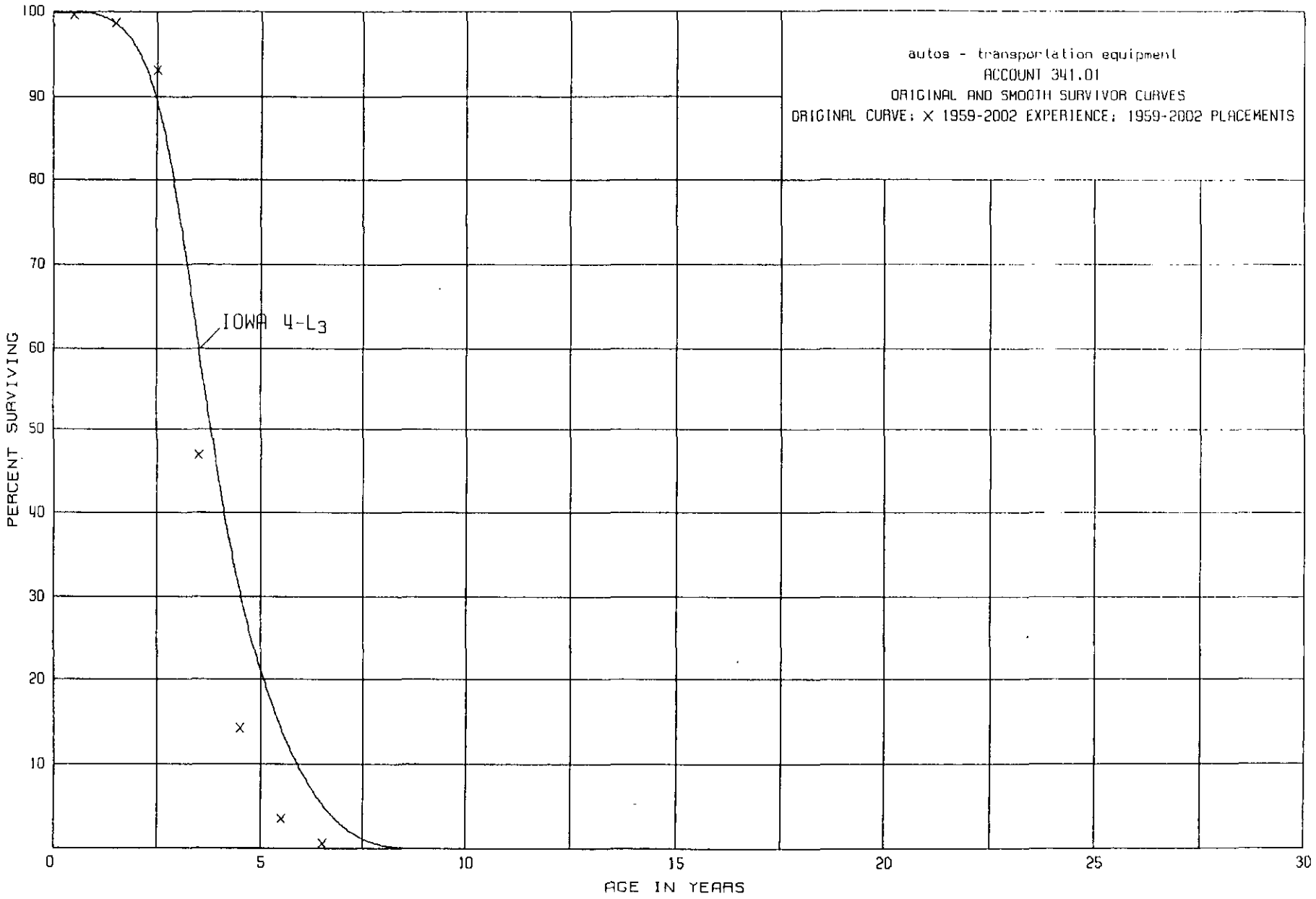
Account 392

(MAWC Account 341.01&342.01)

Transportation Equipment

ITEMS

- Airplanes
- Automobiles
- Bicycles
- Electrical Vehicles
- Motor Trucks
- Motorcycles
- Repair Cars or Trucks
- Tractors and Trailers
- Other Transportation Vehicles



Schedule 4-100

autos - transportation equipment

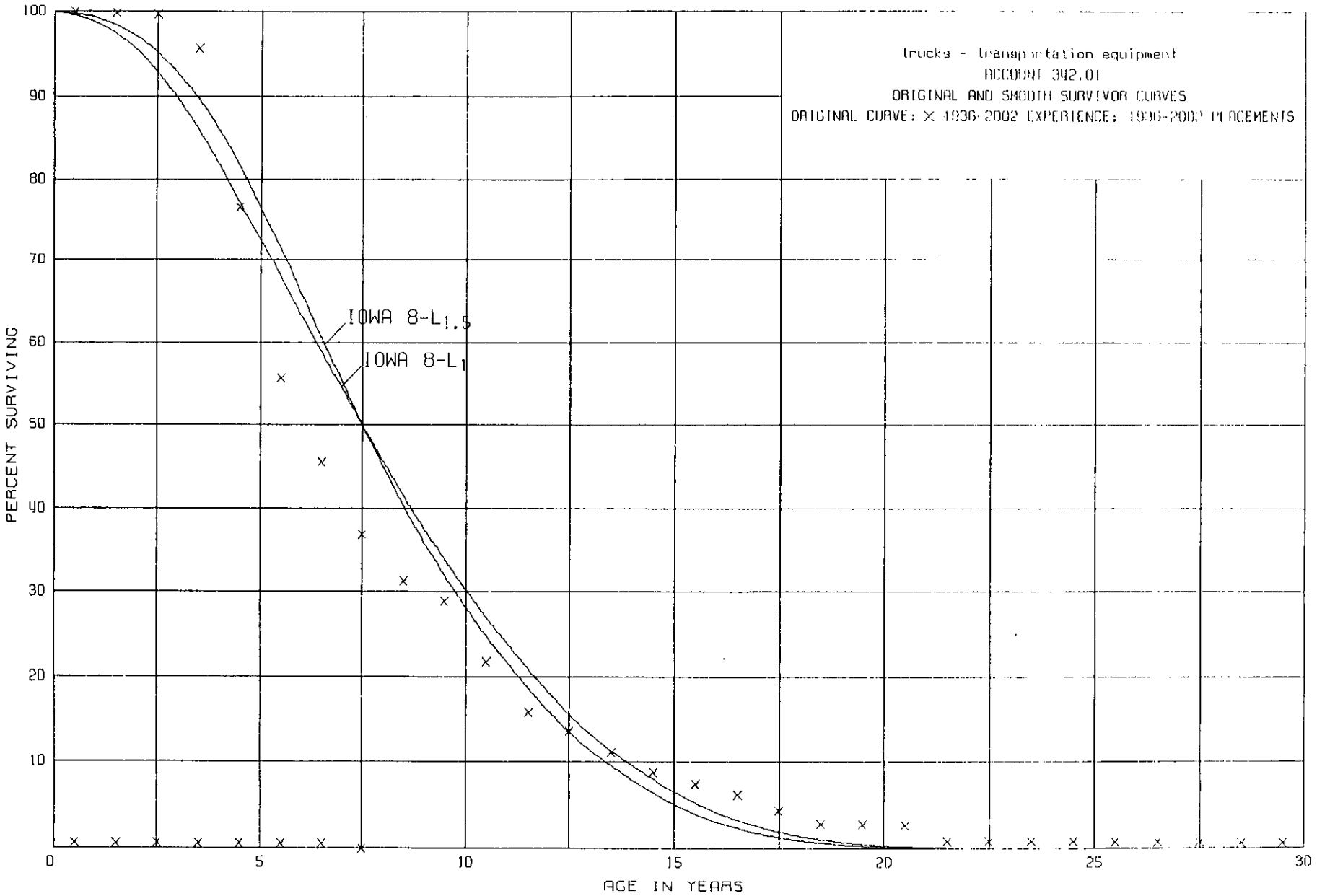
ACCOUNT 341.01

SUMMARY OF CURVE FITTING RESULTS - PCT SURV BALANCED AREAS

PLACEMENT BAND 1959-2002 EXPERIENCE BAND 1959-2002

SURVIVOR CURVE	RESID MEAS	RANGE OF FIT	SURVIVOR CURVE	RESID MEAS	RANGE OF FIT*
3.6-S0	12.94	0 - 7	NOT FITTED		
3.6-S0.5	10.96	0 - 7	NOT FITTED		
3.6-S1	9.09	0 - 7	NOT FITTED		
3.6-S1.5	7.26	0 - 7	NOT FITTED		
3.6-S2	5.61	0 - 7	NOT FITTED		
3.6-S2.5	4.24	0 - 7	NOT FITTED		
3.6-S3	3.38	0 - 7	NOT FITTED		
3.6-S4	4.67	0 - 7	NOT FITTED		
3.6-S5	7.24	0 - 7	NOT FITTED		
3.6-R0.5	15.15	0 - 7	NOT FITTED		
3.6-R1	12.64	0 - 7	NOT FITTED		
3.6-R1.5	10.45	0 - 7	NOT FITTED		
3.6-R2	8.49	0 - 7	NOT FITTED		
3.6-R2.5	6.74	0 - 7	NOT FITTED		
3.6-R3	5.57	0 - 7	NOT FITTED		
3.6-R4	5.76	0 - 7	NOT FITTED		
3.6-R5	7.67	0 - 7	NOT FITTED		
3.7-L0	17.23	0 - 7	NOT FITTED		
3.7-L0.5	15.50	0 - 7	NOT FITTED		
3.6-L1	13.57	0 - 7	NOT FITTED		
3.6-L1.5	11.48	0 - 7	NOT FITTED		
3.6-L2	9.45	0 - 7	NOT FITTED		
3.6-L2.5	7.11	0 - 7	NOT FITTED		
3.6-L3	4.81	0 - 7	NOT FITTED		
3.6-L4	1.89	0 - 7	NOT FITTED		
3.6-L5	4.52	0 - 7	NOT FITTED		
3.6-O1	17.90	0 - 7	NOT FITTED		
3.8-O2	18.36	0 - 7	NOT FITTED		

* SEGMENT BETWEEN 85.0 AND 15.0 PERCENT SURVIVING.


Trucks - transportation equipment
ACCOUNT 342.01
ORIGINAL AND SMOOTH SURVIVOR CURVES
ORIGINAL CURVE: X 1936-2002 EXPERIENCE; 1936-2002 PLACEMENTS
IOWA 8-L1.5
IOWA 8-L1
PERCENT SURVIVING
AGE IN YEARS
100
90
80
70
60
50
40
30
20
10
0
5
10
15
20
25
30

trucks - transportation equipment

ACCOUNT 342.01

SUMMARY OF CURVE FITTING RESULTS - PCT SURV BALANCED AREAS

PLACEMENT BAND 1936-2002			EXPERIENCE BAND 1936-2002		
SURVIVOR CURVE	RESID MEAS	RANGE OF FIT	SURVIVOR CURVE	RESID MEAS	RANGE OF FIT*
7.5-S0	7.91	0 - 17	6.8-S0	6.17	4 - 12
7.5-S0.5	8.09	0 - 17	6.9-S0.5	7.44	4 - 12
7.5-S1	8.75	0 - 17	7.0-S1	9.13	4 - 12
7.5-R0.5	9.00	0 - 17	6.7-R0.5	5.97	4 - 12
7.5-R1	9.31	0 - 17	6.8-R1	8.08	4 - 12
7.5-R1.5	9.82	0 - 17	6.8-R1.5	9.98	4 - 12
7.6-L0	7.43	0 - 17	7.0-L0	4.43	4 - 12
7.6-L0.5	6.37	0 - 17	7.0-L0.5	4.00	4 - 12
7.6-L1	5.82	0 - 17	7.0-L1	4.16	4 - 12
7.6-L1.5	5.77	0 - 17	7.1-L1.5	4.88	4 - 12
7.6-L2	6.46	0 - 17	7.1-L2	6.29	4 - 12
7.5-L2.5	7.90	0 - 17	7.1-L2.5	8.76	4 - 12
7.5-O1	9.67	0 - 17	6.6-O1	5.26	4 - 12
7.8-O2	8.73	0 - 17	7.2-O2	4.92	4 - 12
8.8-O3	12.07	0 - 17	8.3-O3	7.69	4 - 12

* SEGMENT BETWEEN 85.0 AND 15.0 PERCENT SURVIVING.

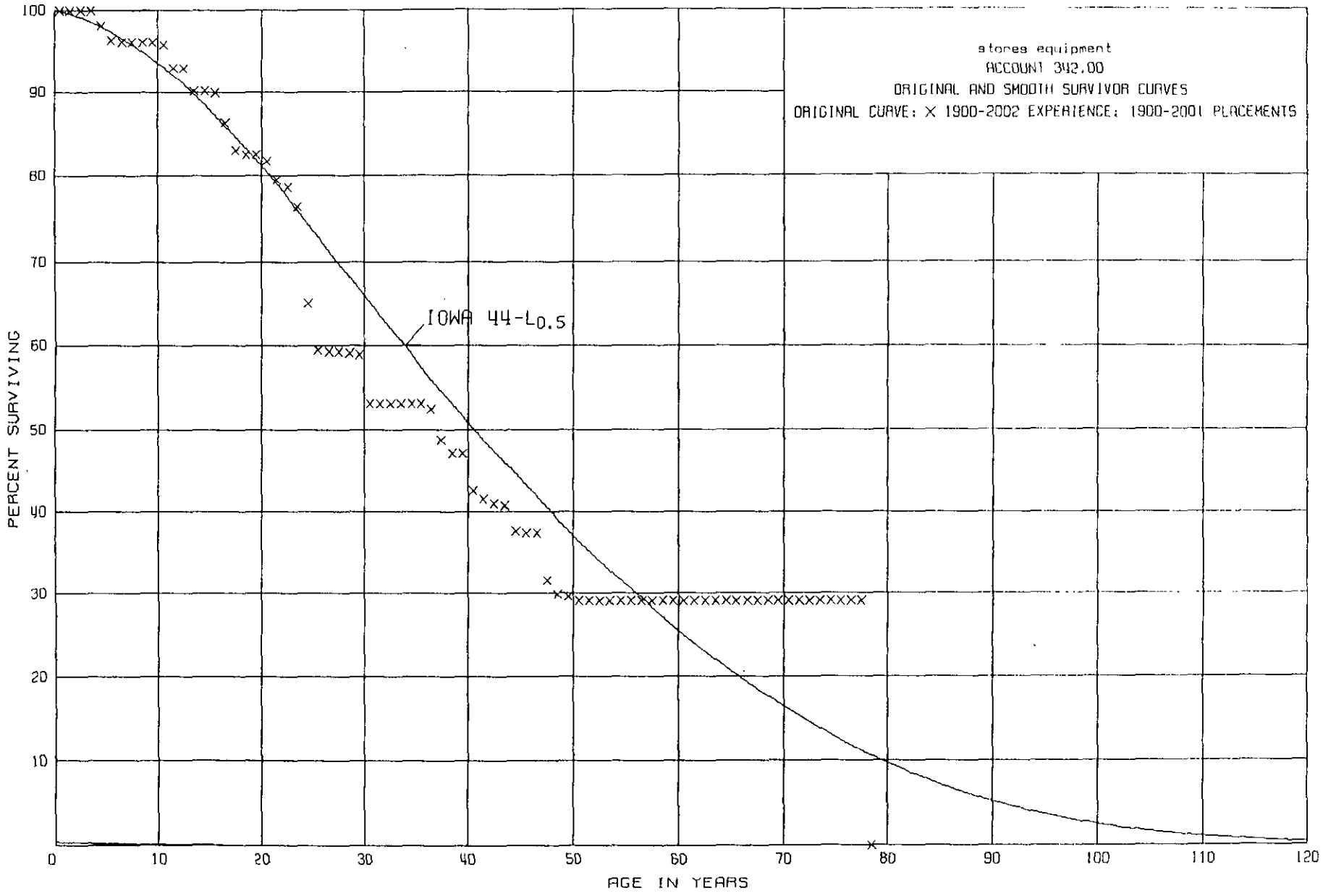
Account 393

(MAWC Account 342.00)

Stores Equipment

ITEMS

- Chain Falls
- Counters
- Cranes
- Elevating and Stacking Equipment
- Hoists
- Lockers
- Scales
- Shelving
- Storage Bins
- Trucks, hand and power driven
- Wheelbarrows


stores equipment
ACCOUNT 342.00
ORIGINAL AND SMOOTH SURVIVOR CURVES
ORIGINAL CURVE: X 1900-2002 EXPERIENCE: 1900-2001 PLACEMENTS
IOWA 44-L0.5
PERCENT SURVIVING
AGE IN YEARS
100
90
80
70
60
50
40
30
20
10
0
10
20
30
40
50
60
70
80
90
100
110
120

stores equipment

ACCOUNT 342.00

SUMMARY OF CURVE FITTING RESULTS - PCT SURV BALANCED AREAS

PLACEMENT BAND 1900-2001			EXPERIENCE BAND 1900-2002		
SURVIVOR CURVE	RESID MEAS	RANGE OF FIT	SURVIVOR CURVE	RESID MEAS	RANGE OF FIT*
42.4-S0	11.11	0 - 79	42.5-S0	12.61	17 - 78
42.4-S0.5	12.60	0 - 79	42.7-S0.5	14.26	17 - 78
42.4-S1	14.29	0 - 79	42.9-S1	16.13	17 - 78
42.5-R0.5	10.31	0 - 79	41.9-R0.5	11.65	17 - 78
42.4-R1	12.65	0 - 79	42.2-R1	14.39	17 - 78
42.4-R1.5	14.36	0 - 79	42.5-R1.5	16.32	17 - 78
44.6-L0	6.96	0 - 79	44.1-L0	7.51	17 - 78
43.9-L0.5	7.73	0 - 79	43.8-L0.5	8.66	17 - 78
43.2-L1	8.92	0 - 79	43.5-L1	10.06	17 - 78
42.6-O1	8.61	0 - 79	41.7-O1	9.45	17 - 78
46.5-O2	7.29	0 - 79	45.3-O2	7.24	17 - 78
55.8-O3	6.95	0 - 79	53.2-O3	5.42	17 - 78
67.7-O4	7.97	0 - 79	63.1-O4	6.19	17 - 78

* SEGMENT BETWEEN 85.0 AND 15.0 PERCENT SURVIVING.

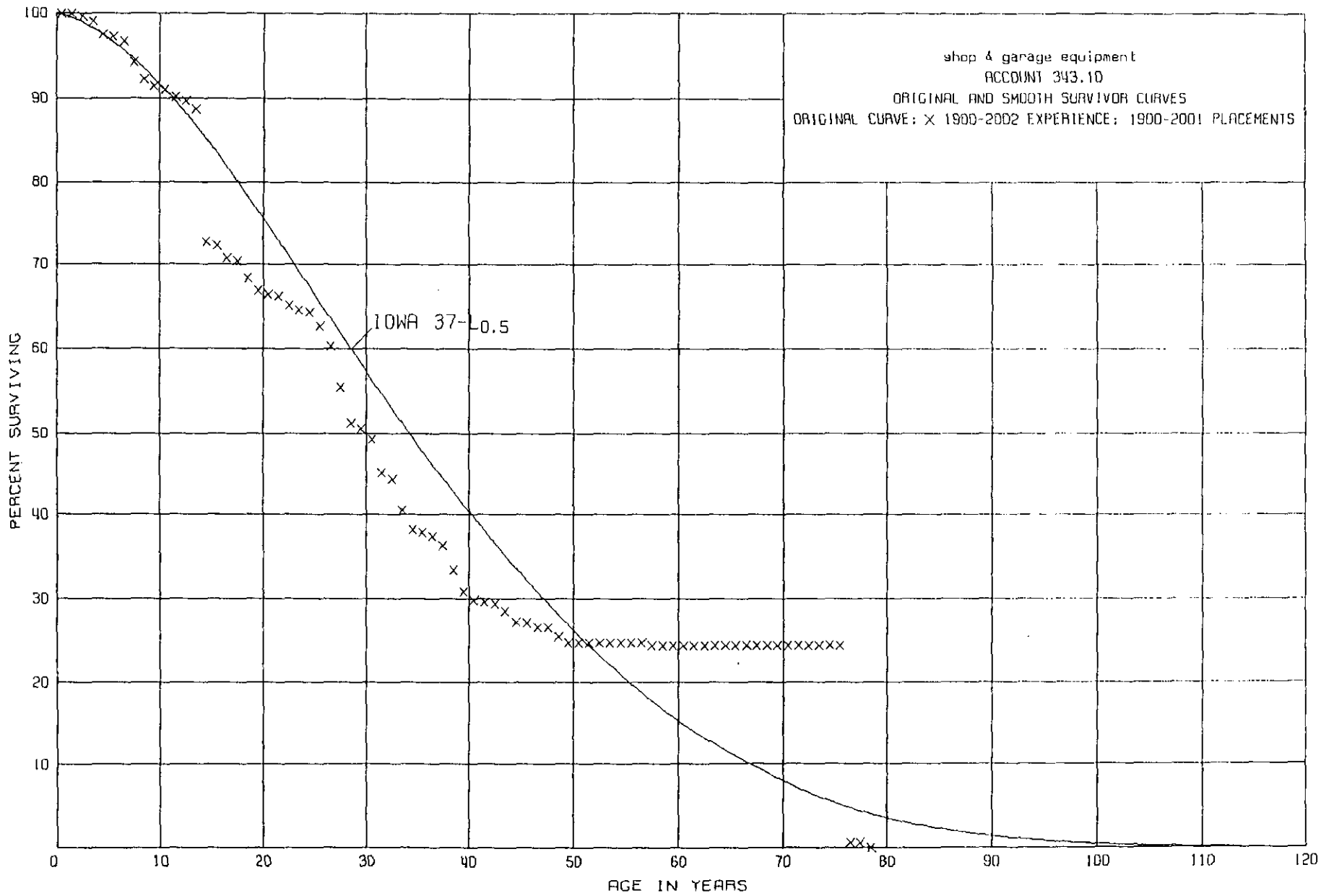
Account 394

(MAWC Account 343.10&343.20)

Tools, Shop and Garage Equipment

ITEMS

- Air Compressors
- Anvils
- Automobile Repair Shop Equipment
- Battery Charging Equipment
- Belts, Shafts and Countershafts
- Boilers
- Cable Pulling Equipment
- Concrete Mixers
- Drill Presses
- Derricks
- Electric Equipment
- Engines
- Forges
- Furnaces
- Foundations and Settings
- Gas Producers
- Gasoline Pumps, Oil Pumps and Storage Tanks
- Greasing Tools and Equipment
- Hoists
- Ladders
- Lathes
- Machine Tools
- Motor Driven Tools
- Motors
- Pipe Threading and Cutting Tools
- Pneumatic Tools
- Pumps
- Riveters
- Smithing Equipment
- Tool Racks
- Vises
- Welding Apparatus
- Work Benches



Schedule 4-110

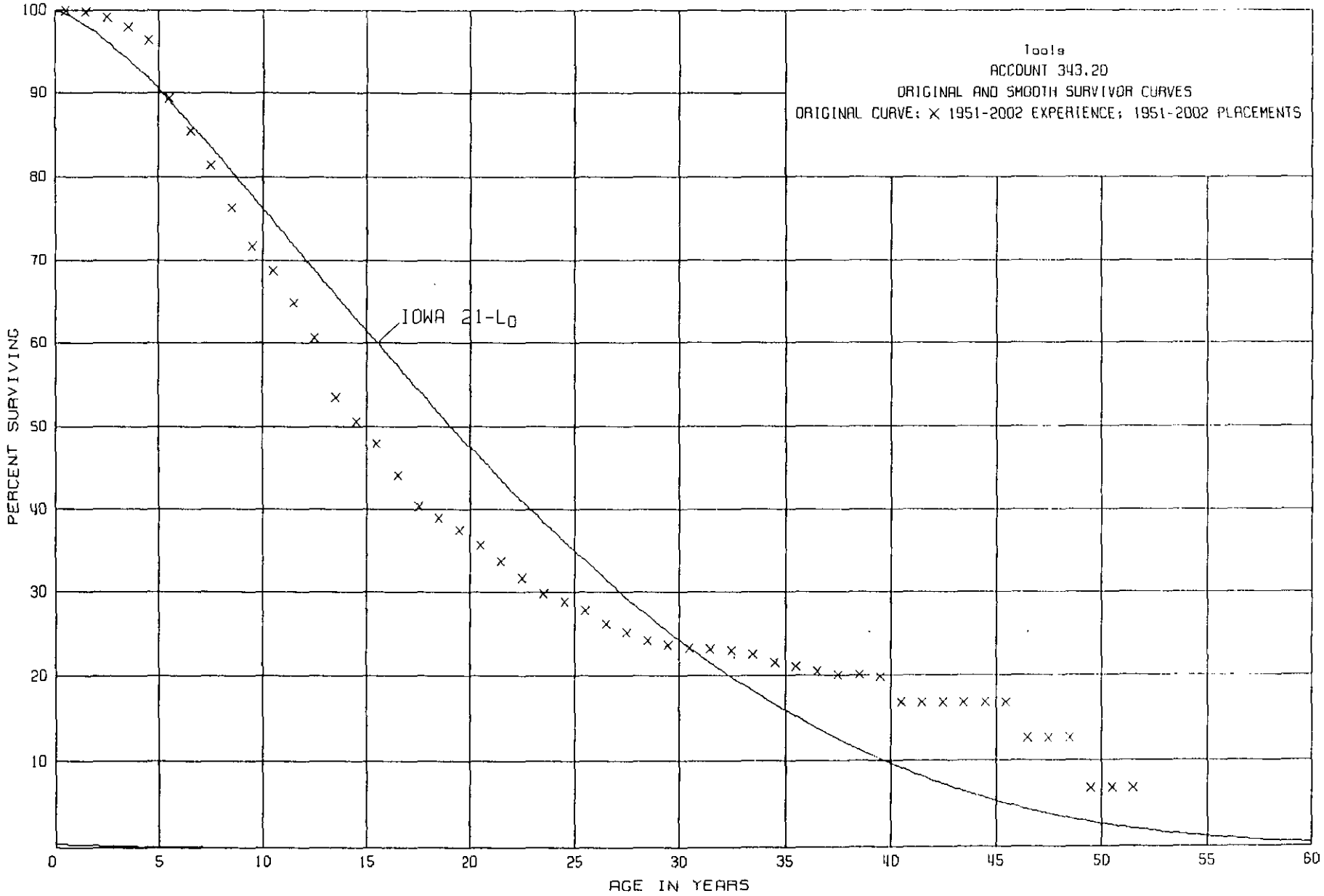
shop & garage equipment

ACCOUNT 343.10

SUMMARY OF CURVE FITTING RESULTS - PCT SURV BALANCED AREAS

PLACEMENT BAND 1900-2001			EXPERIENCE BAND 1900-2002		
SURVIVOR CURVE	RESID MEAS	RANGE OF FIT	SURVIVOR CURVE	RESID MEAS	RANGE OF FIT*
32.3-S0	7.86	0 - 58	32.3-S0	9.01	14 - 58
32.3-S0.5	9.51	0 - 58	32.5-S0.5	10.81	14 - 58
32.2-S1	11.40	0 - 58	32.7-S1	12.82	14 - 58
32.4-R0.5	6.96	0 - 58	31.8-R0.5	7.82	14 - 58
32.3-R1	9.27	0 - 58	32.0-R1	10.67	14 - 58
32.2-R1.5	11.14	0 - 58	32.3-R1.5	12.76	14 - 58
34.3-L0	4.14	0 - 58	33.6-L0	4.15	14 - 58
33.6-L0.5	4.74	0 - 58	33.4-L0.5	5.36	14 - 58
33.1-L1	6.05	0 - 58	33.2-L1	6.89	14 - 58
32.6-O1	5.74	0 - 58	31.6-O1	5.70	14 - 58
35.9-O2	4.84	0 - 58	34.5-O2	3.73	14 - 58
43.7-O3	6.16	0 - 58	40.7-O3	4.44	14 - 58

* SEGMENT BETWEEN 85.0 AND 15.0 PERCENT SURVIVING.


Tools
ACCOUNT 343.2D
ORIGINAL AND SMOOTH SURVIVOR CURVES
ORIGINAL CURVE: X 1951-2002 EXPERIENCE; 1951-2002 PLACEMENTS
IOWA 21-L0
PERCENT SURVIVING
AGE IN YEARS
100
90
80
70
60
50
40
30
20
10
0
5
10
15
20
25
30
35
40
45
50
55
60

Tools

ACCOUNT 343.20

SUMMARY OF CURVE FITTING RESULTS - PCT SURV BALANCED AREAS

PLACEMENT BAND 1951-2002			EXPERIENCE BAND 1951-2002		
SURVIVOR CURVE	RESID MEAS	RANGE OF FIT	SURVIVOR CURVE	RESID MEAS	RANGE OF FIT*
16.8-S0	7.33	0 - 29	16.8-S0	8.34	7 - 29
16.7-S0.5	9.24	0 - 29	16.8-S0.5	10.42	7 - 29
16.7-S1	11.25	0 - 29	16.9-S1	12.58	7 - 29
16.9-R0.5	6.55	0 - 29	16.6-R0.5	7.19	7 - 29
16.7-R1	9.00	0 - 29	16.6-R1	10.28	7 - 29
16.7-R1.5	11.12	0 - 29	16.7-R1.5	12.68	7 - 29
18.0-L0	3.61	0 - 29	17.6-L0	3.40	7 - 29
17.6-L0.5	4.19	0 - 29	17.4-L0.5	4.65	7 - 29
17.2-L1	5.56	0 - 29	17.3-L1	6.24	7 - 29
17.1-O1	5.25	0 - 29	16.5-O1	4.76	7 - 29
18.9-O2	4.72	0 - 29	18.1-O2	3.42	7 - 29
23.4-O3	5.85	0 - 29	21.8-O3	3.90	7 - 29

* SEGMENT BETWEEN 85.0 AND 15.0 PERCENT SURVIVING.

max age 52

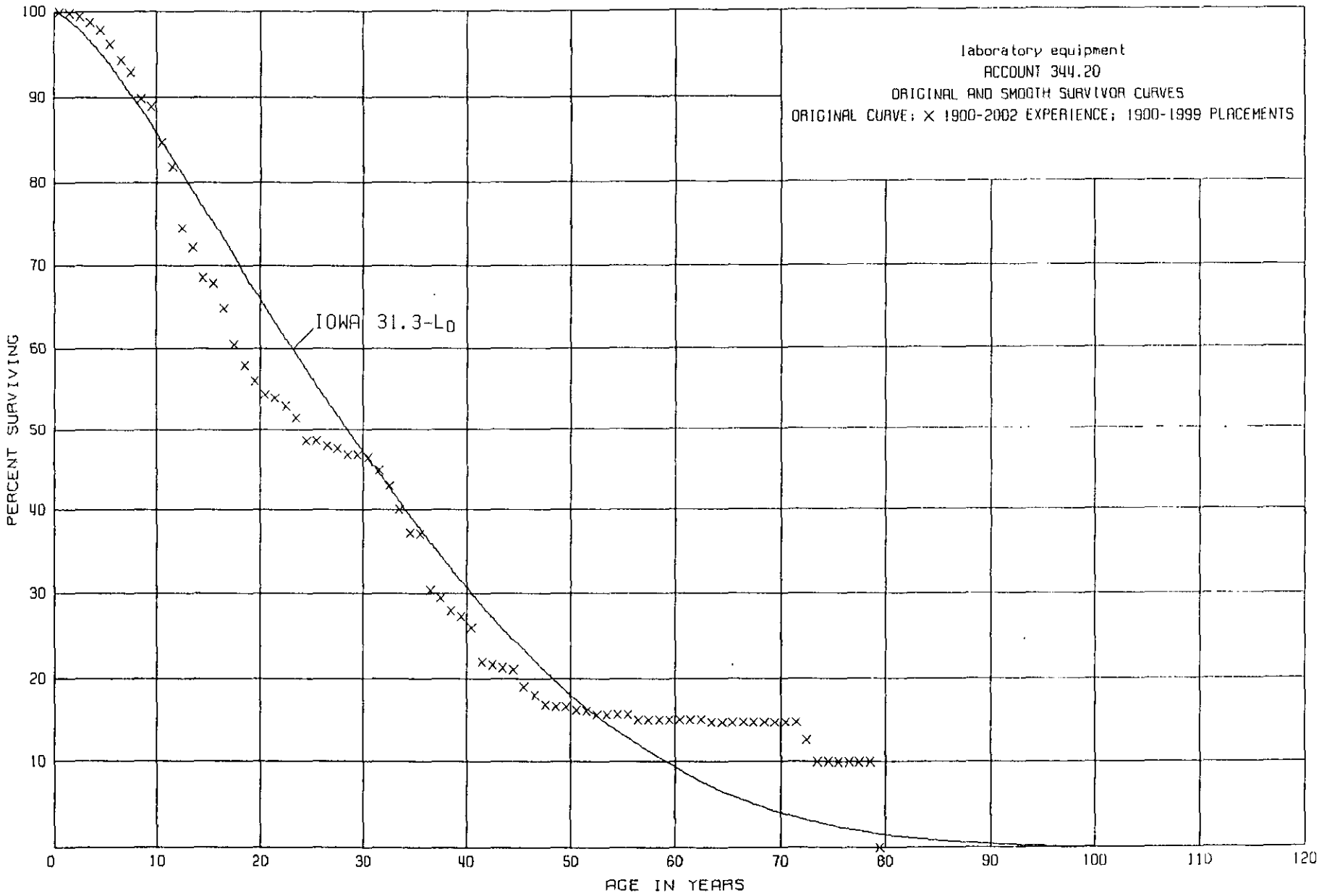
Account 395

(MAWC Account 344.10&344.20)

Laboratory Equipment

ITEMS

- Autoclaves
- Barometers
- Cameras
- Centrifuge
- Distilling Apparatus
- Furnaces
- Microscopes
- Ovens
- Pitometers
- Rain Gauges
- Refrigerators
- Scales
- Sterilizers
- Stop Watches
- Testing Machines
- Thermometers
- Voltmeters
- Other Bacteriological, Electric, Chemical Hydraulic or Research Equipment


laboratory equipment
ACCOUNT 344.20
ORIGINAL AND SMOOTH SURVIVOR CURVES
ORIGINAL CURVE: X 1900-2002 EXPERIENCE; 1900-1999 PLACEMENTS
IOWA 31.3-L0
PERCENT SURVIVING
AGE IN YEARS
100
90
80
70
60
50
40
30
20
10
0
10
20
30
40
50
60
70
80
90
100
110
120

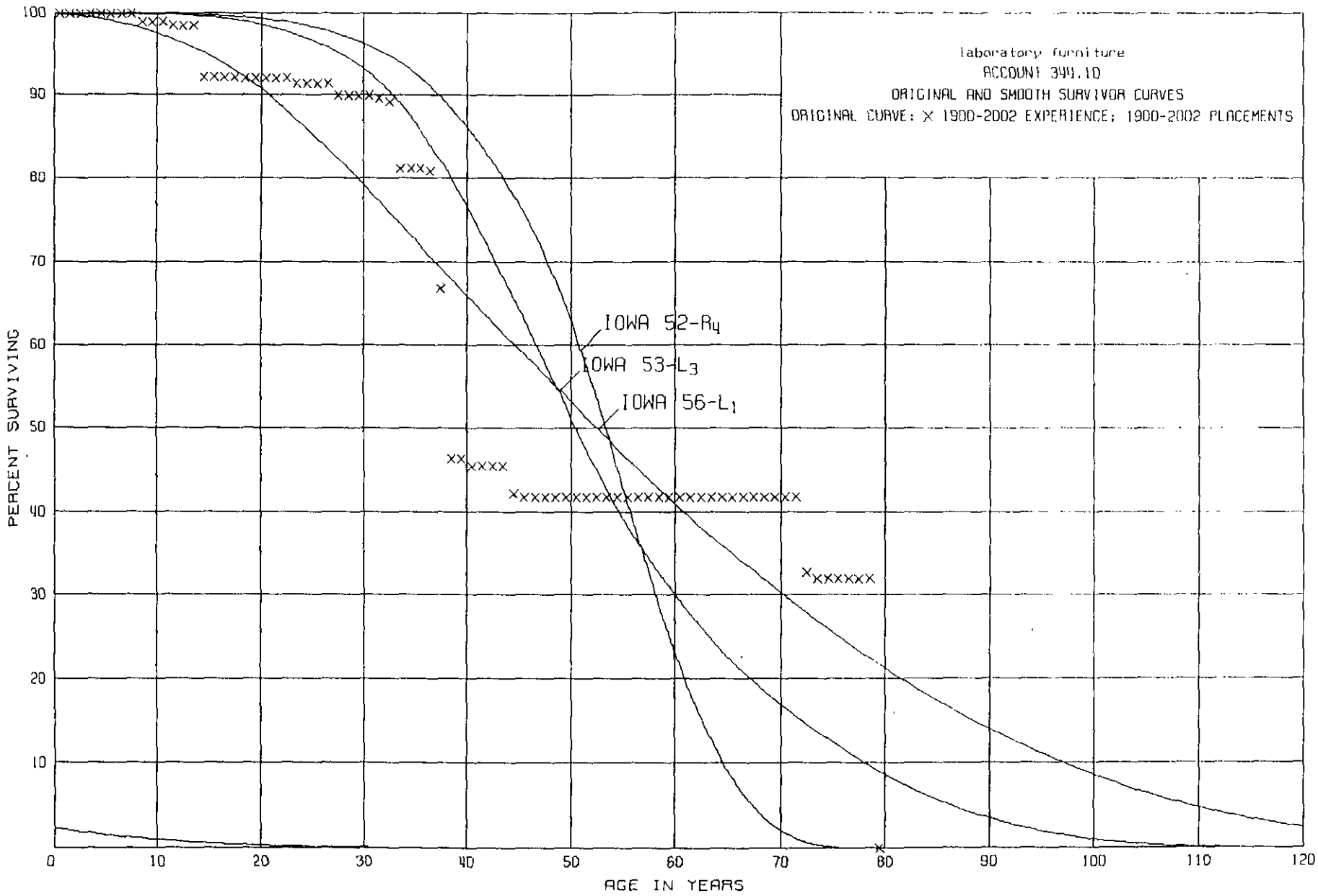
laboratory equipment

ACCOUNT 344.20

SUMMARY OF CURVE FITTING RESULTS - PCT SURV BALANCED AREAS

PLACEMENT BAND 1900-1999			EXPERIENCE BAND 1900-2002		
SURVIVOR CURVE	RESID MEAS	RANGE OF FIT	SURVIVOR CURVE	RESID MEAS	RANGE OF FIT*
25.7-S0	7.46	0 - 40	25.7-S0	8.60	10 - 40
25.5-S0.5	9.67	0 - 40	25.6-S0.5	11.04	10 - 40
25.3-S1	11.98	0 - 40	25.6-S1	13.44	10 - 40
26.0-R0.5	6.00	0 - 40	25.5-R0.5	6.87	10 - 40
25.5-R1	8.57	0 - 40	25.3-R1	10.01	10 - 40
25.3-R1.5	11.22	0 - 40	25.3-R1.5	12.94	10 - 40
28.4-L0	4.03	0 - 40	27.9-L0	4.38	10 - 40
27.5-L0.5	5.12	0 - 40	27.3-L0.5	5.92	10 - 40
26.7-L1	6.71	0 - 40	26.8-L1	7.67	10 - 40
26.8-O1	4.50	0 - 40	25.9-O1	4.07	10 - 40
30.0-O2	4.45	0 - 40	28.9-O2	3.88	10 - 40
38.6-O3	4.91	0 - 40	36.3-O3	3.34	10 - 40

* SEGMENT BETWEEN 85.0 AND 15.0 PERCENT SURVIVING.


laboratory furniture
ACCOUNT 340.10
ORIGINAL AND SMOOTH SURVIVOR CURVES
ORIGINAL CURVE: X 1900-2002 EXPERIENCE; 1900-2002 PLACEMENTS
IOWA 52-R4
IOWA 53-L3
IOWA 56-L1
PERCENT SURVIVING
AGE IN YEARS
100
90
80
70
60
50
40
30
20
10
0
10
20
30
40
50
60
70
80
90
100
110
120

laboratory furniture

ACCOUNT 344.10

SUMMARY OF CURVE FITTING RESULTS - PCT SURV BALANCED AREAS

PLACEMENT BAND 1900-2002			EXPERIENCE BAND 1900-2002		
SURVIVOR CURVE	RESID MEAS	RANGE OF FIT	SURVIVOR CURVE	RESID MEAS	RANGE OF FIT*
58.2-S0	8.85	0 - 42	NOT FITTED		
52.5-S0.5	8.16	0 - 42	NOT FITTED		
48.1-S1	7.42	0 - 42	NOT FITTED		
45.2-S1.5	6.81	0 - 42	NOT FITTED		
42.8-S2	6.39	0 - 42	NOT FITTED		
41.3-S2.5	6.06	0 - 42	NOT FITTED		
40.0-S3	6.18	0 - 42	NOT FITTED		
38.1-S4	7.33	0 - 42	NOT FITTED		
72.6-R0.5	10.37	0 - 42	NOT FITTED		
60.1-R1	9.76	0 - 42	NOT FITTED		
52.4-R1.5	8.91	0 - 42	NOT FITTED		
46.8-R2	7.74	0 - 42	NOT FITTED		
43.4-R2.5	6.70	0 - 42	NOT FITTED		
40.9-R3	5.75	0 - 42	NOT FITTED		
38.5-R4	5.45	0 - 42	NOT FITTED		
37.3-R5	8.25	0 - 42	NOT FITTED		
78.5-L0	9.70	0 - 42	NOT FITTED		
67.6-L0.5	9.06	0 - 42	NOT FITTED		
59.4-L1	8.30	0 - 42	NOT FITTED		
53.4-L1.5	7.57	0 - 42	NOT FITTED		
48.9-L2	6.84	0 - 42	NOT FITTED		
45.7-L2.5	6.27	0 - 42	NOT FITTED		
43.2-L3	6.02	0 - 42	NOT FITTED		
39.6-L4	6.13	0 - 42	NOT FITTED		
38.0-L5	8.08	0 - 42	NOT FITTED		
87.8-O1	10.66	0 - 42	NOT FITTED		
98.8-O2	10.66	0 - 42	NOT FITTED		
143.1-O3	10.75	0 - 42	NOT FITTED		

* SEGMENT BETWEEN 85.0 AND 15.0 PERCENT SURVIVING.

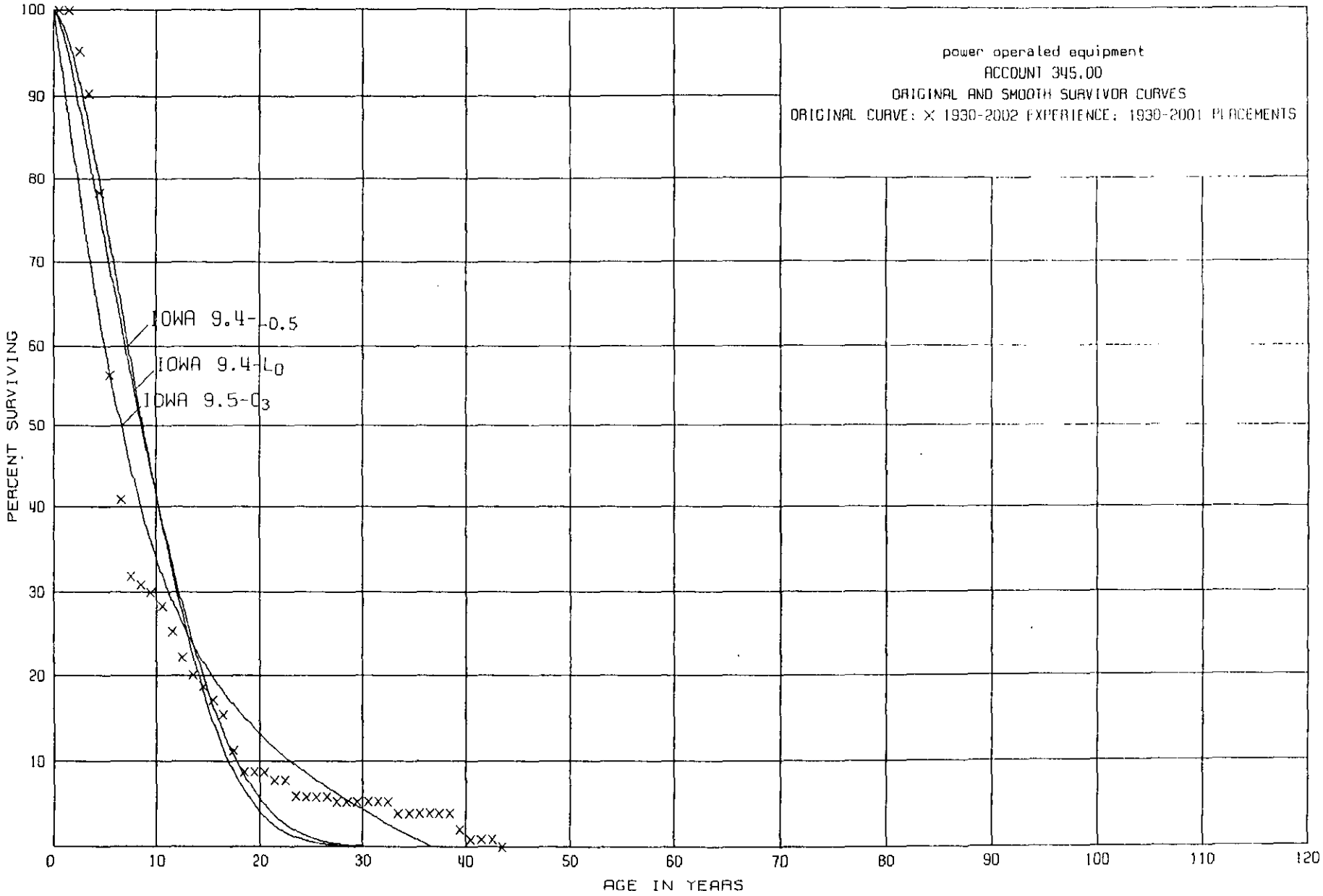
Account 396

(MAWC Account 345.00)

Power Operated Equipment

ITEMS

- Air Compressors, including driving unit and vehicle
- Back Filling Machines
- Boring Machines
- Bulldozers
- Cranes and Hoists
- Diggers
- Engines
- Pile Drivers
- Pipe Cleaning Machines
- Pipe Coating or Wrapping Machines
- Tractors – Crawler Type
- Trenchers
- Other Power Operated Equipment


power operated equipment
ACCOUNT 345.00
ORIGINAL AND SMOOTH SURVIVOR CURVES
ORIGINAL CURVE: X 1930-2002 EXPERIENCE; 1930-2001 PLACEMENTS
IOWA 9.4-L0.5
IOWA 9.4-L0
IOWA 9.5-O3
PERCENT SURVIVING
AGE IN YEARS
100
90
80
70
60
50
40
30
20
10
0
10
20
30
40
50
60
70
80
90
100
110
120

power operated equipment

ACCOUNT 345.00

SUMMARY OF CURVE FITTING RESULTS - PCT SURV BALANCED AREAS

PLACEMENT BAND 1930-2001			EXPERIENCE BAND 1930-2002		
SURVIVOR CURVE	RESID MEAS	RANGE OF FIT	SURVIVOR CURVE	RESID MEAS	RANGE OF FIT*
9.3-S0	10.71	0 - 40	7.9-S0	13.61	4 - 17
9.3-S0.5	11.35	0 - 40	8.0-S0.5	14.78	4 - 17
9.3-S1	12.14	0 - 40	8.0-S1	16.04	4 - 17
9.3-R0.5	10.68	0 - 40	7.7-R0.5	13.12	4 - 17
9.3-R1	11.69	0 - 40	7.8-R1	15.10	4 - 17
9.3-R1.5	12.50	0 - 40	7.9-R1.5	16.61	4 - 17
9.3-L0	7.89	0 - 40	7.8-L0	8.36	4 - 17
9.3-L0.5	8.33	0 - 40	7.9-L0.5	9.33	4 - 17
9.3-L1	8.99	0 - 40	7.9-L1	10.44	4 - 17
9.3-O1	10.05	0 - 40	7.6-O1	11.77	4 - 17
9.4-O2	7.71	0 - 40	7.9-O2	7.73	4 - 17
9.5-O3	6.62	0 - 40	8.5-O3	6.18	4 - 17
9.3-O4	8.62	0 - 40	9.3-O4	7.77	4 - 17

* SEGMENT BETWEEN 85.0 AND 15.0 PERCENT SURVIVING.

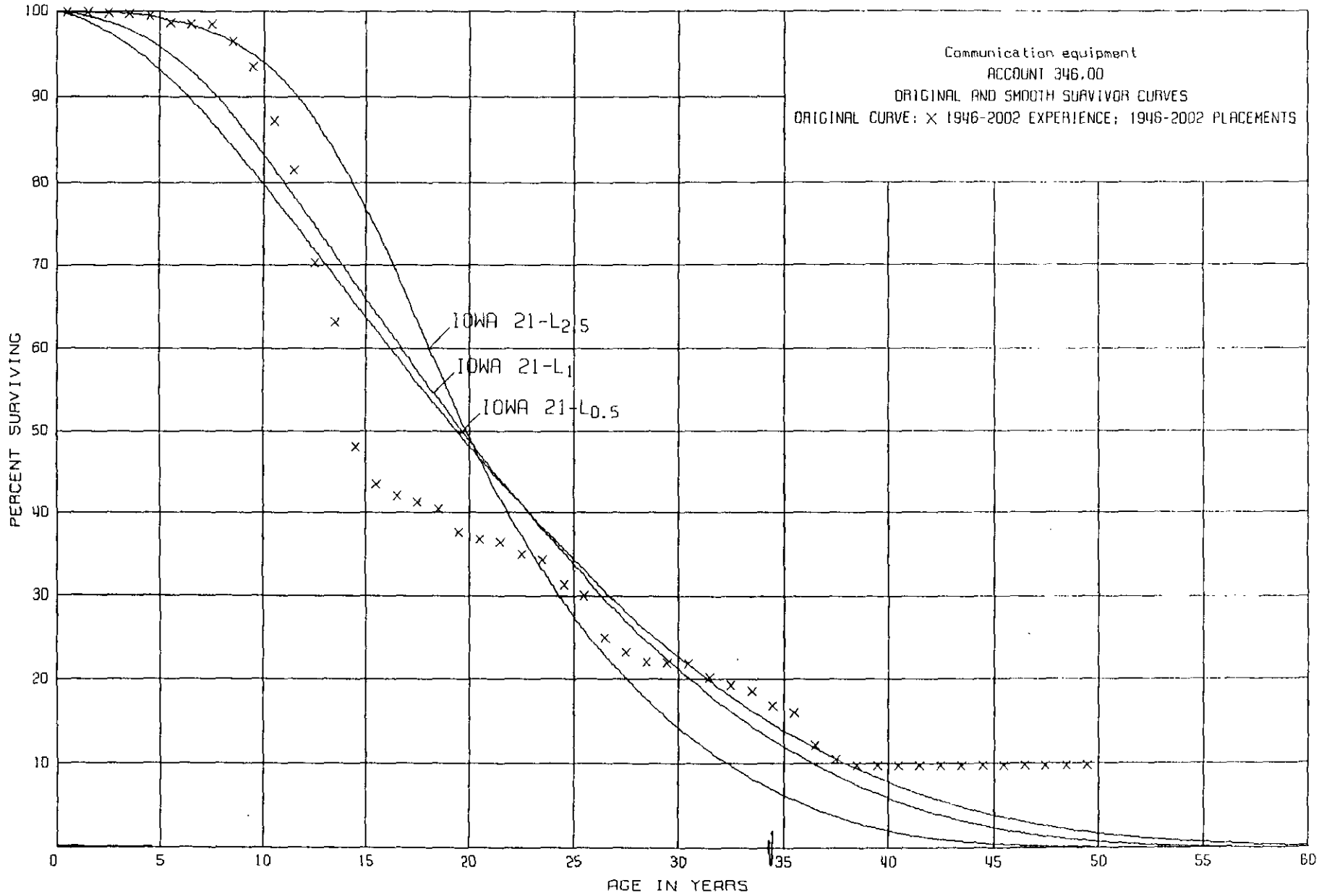
Account 397

(MAWC Account 346.00)

Communication Equipment

ITEMS

- Antennae
- Booths
- Cables
- Distribution Boards
- Extension Cords
- Gongs
- Handsets, Manual and Dial
- Insulators
- Intercommunicating Sets
- Loading Coils
- Operators Desks
- Poles and Fixtures
- Radio Transmitting and Receiving Sets
- Sending Keys
- Storage Batteries
- Switchboards
- Telautograph Circuit Connections
- Telegraph Receiving Sets
- Telephone and Telegraph Circuits
- Testing Instruments
- Towers
- Underground Conduit


Communication equipment
ACCOUNT 346.00
ORIGINAL AND SMOOTH SURVIVOR CURVES
ORIGINAL CURVE: X 1946-2002 EXPERIENCE; 1946-2002 PLACEMENTS
IOWA 21-L2.5
IOWA 21-L1
IOWA 21-L0.5
PERCENT SURVIVING
AGE IN YEARS
100
90
80
70
60
50
40
30
20
10
0
5
10
15
20
25
30
35
40
45
50
55
60

Communication equipment

ACCOUNT 346.00

SUMMARY OF CURVE FITTING RESULTS - PCT SURV BALANCED AREAS

PLACEMENT BAND 1946-2002			EXPERIENCE BAND 1946-2002		
SURVIVOR CURVE	RESID MEAS	RANGE OF FIT	SURVIVOR CURVE	RESID MEAS	RANGE OF FIT*
19.2-S0	9.07	0 - 34	18.5-S0	9.82	11 - 34
19.2-S0.5	9.69	0 - 34	18.7-S0.5	11.22	11 - 34
19.2-S1	10.77	0 - 34	18.9-S1	12.90	11 - 34
19.3-R0.5	10.00	0 - 34	18.1-R0.5	9.29	11 - 34
19.2-R1	10.75	0 - 34	18.4-R1	11.74	11 - 34
19.2-R1.5	11.76	0 - 34	18.6-R1.5	13.61	11 - 34
20.5-L0	8.78	0 - 34	18.8-L0	5.88	11 - 34
20.1-L0.5	7.84	0 - 34	18.9-L0.5	6.46	11 - 34
19.7-L1	7.33	0 - 34	18.9-L1	7.33	11 - 34
19.5-L1.5	7.53	0 - 34	19.1-L1.5	8.51	11 - 34
19.4-L2	8.40	0 - 34	19.2-L2	10.04	11 - 34
19.5-O1	10.36	0 - 34	17.8-O1	7.62	11 - 34
21.5-O2	10.19	0 - 34	19.1-O2	5.86	11 - 34
26.3-O3	11.84	0 - 34	21.7-O3	6.28	11 - 34

* SEGMENT BETWEEN 85.0 AND 15.0 PERCENT SURVIVING.

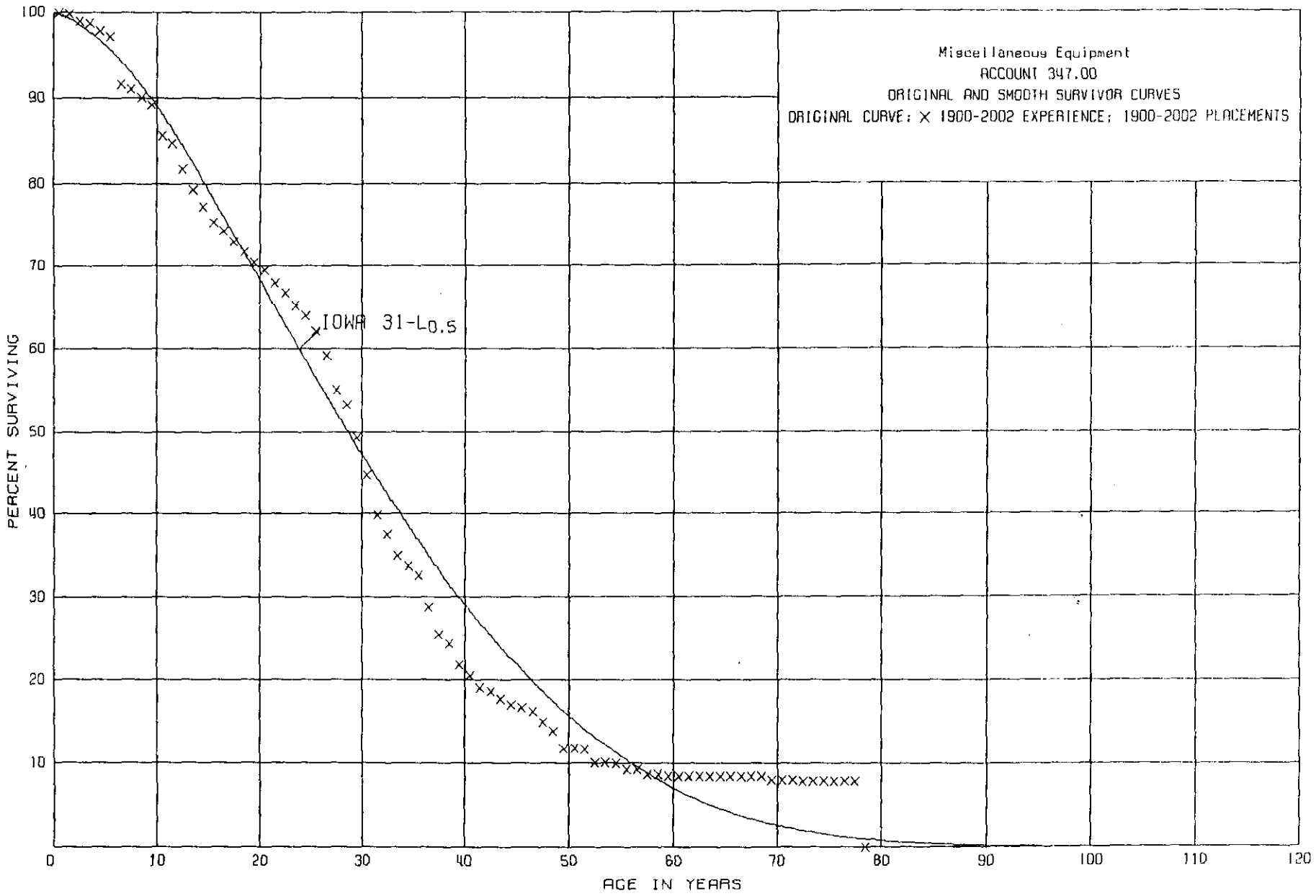
Account 398

(MAWC Account 347.00)

Miscellaneous Equipment

ITEMS

- Hospital and Infirmary Equipment
- Recreation Equipment
- Radios
- Restaurant Equipment
- Soda Fountains
- Operator's Cottage Furnishings
- Electric Signs
- Other Miscellaneous Equipment


Miscellaneous Equipment
ACCOUNT 347.00
ORIGINAL AND SMOOTH SURVIVOR CURVES
ORIGINAL CURVE: X 1900-2002 EXPERIENCE; 1900-2002 PLACEMENTS
IOWA 31-L0.5
PERCENT SURVIVING
AGE IN YEARS
100
90
80
70
60
50
40
30
20
10
0
10
20
30
40
50
60
70
80
90
100
110
120

Miscellaneous Equipment

ACCOUNT 347.00

SUMMARY OF CURVE FITTING RESULTS - PCT SURV BALANCED AREAS

PLACEMENT BAND 1900-2002			EXPERIENCE BAND 1900-2002		
SURVIVOR CURVE	RESID MEAS	RANGE OF FIT	SURVIVOR CURVE	RESID MEAS	RANGE OF FIT*
30.8-S0	5.99	0 - 79	28.4-S0	3.06	11 - 47
30.8-S0.5	6.45	0 - 79	28.4-S0.5	4.39	11 - 47
30.8-S1	7.39	0 - 79	28.4-S1	6.44	11 - 47
30.8-R0.5	6.22	0 - 79	28.1-R0.5	2.88	11 - 47
30.8-R1	6.61	0 - 79	28.0-R1	3.49	11 - 47
30.8-R1.5	7.25	0 - 79	28.1-R1.5	5.59	11 - 47
30.9-L0	4.56	0 - 79	30.3-L0	5.27	11 - 47
30.8-L0.5	4.10	0 - 79	29.8-L0.5	4.05	11 - 47
30.8-L1	4.50	0 - 79	29.4-L1	3.64	11 - 47
30.8-L1.5	5.16	0 - 79	29.2-L1.5	4.59	11 - 47
30.8-O1	7.06	0 - 79	28.2-O1	5.34	11 - 47
31.2-O2	4.85	0 - 79	31.3-O2	5.88	11 - 47
33.8-O3	9.32	0 - 79	38.3-O3	9.61	11 - 47

* SEGMENT BETWEEN 85.0 AND 15.0 PERCENT SURVIVING.

full band - 79 years

Account 399

(MAWC Account 348.00)

Other Tangible Property

MAWC WR-2003-500 OTHER TANGIBLE PROPERTY

ACCOUNT 348.00

NO RETIREMENTS

WR-2003-0500

MISSOURI AMERICAN WATER COMPANY

SCHEDULE 5. PARKVILLE DISTRICT SEWER SYSTEM DEPRECIATION RATE DETERMINATION AND CORRESPONDING ANNUAL ACCRUAL AS OF DECEMBER 31, 2002

ACCOUNT NUMBER	TITLE	ORIGINAL COST 12/31/2002	PROPOSED LIFE (YEARS)	PROPOSED IOWA CURVE	PROPOSED DEPRECIATION RATE	PROPOSED ANNUAL ACCRUAL	ORDERED DEPRECIATION RATE	ORDERED ANNUAL ACCRUAL	† THEORETICAL RESERVE	BOOK RESERVE
(1)	(2)	(3)	(4)	(5)	(6)=100%/(4)	(7)=(6)X(3)	(8)	(9)=(8)X(3)	(11)	(10)
352.20	COLLECTION SEWERS - GRAVITY	30,459.00	50	***	2.00%	609	1.33%	405		13,548
353.00	SERVICES	7,951.00	50	***	2.00%	159	2.00%	159		5,477
374.00	OUTFALL SEWER LINE	33,743.00	50	***	2.00%	675	1.50%	506	-	3,622
	COLUMN TOTALS	72,153.00				1,443.06		1,070.27	-	22,647.00

† NO THEORETICAL BALANCE WAS CALCULATED AS DISCUSSED IN TESTIMONY

*** ACCOUNT ASSIGNED STAFF'S STANDARDIZED DEPRECIATION RATES

Schedule 5