The Data Services group of the A. M. Best Company has used the SAS* system to develop products, analyze data and support production of several insurance data-oriented products and services. This paper will describe some of the experiences in using base SAS software by presenting several examples of this use. For the most part, these are not very sophisticated examples (some exceptions) and this will not be a highly technical dissertation on the use of SAS. Still, they are interesting and represent a variety of applications which illustrate how easy it is to use base SAS software in several real world applications.

BACKGROUND - A. M. BEST CO.

The A. M. Best Company serves the Insurance industry and the Insurance marketplace. It maintains the most comprehensive database on approximately 3500 insurance companies in the U.S. and Canada and within the last few years has been adding European companies also. The company began business in 1899 and is now located in Oldwick, New Jersey. Best's Insurance Reports are recognized as the standard reference works in the industry. They contain financial and operating summaries on insurance and reinsurance companies together with Best's Rating - the best guide to a company's financial stability and profitability.

The A. M. Best company has many insurance related products and services, among which are books, magazines, newsletters, data studies, data tapes, data diskettes and timesharing services. Most products are available in both standard and custom versions.

The data sources for this data include the annual convention statement that the insurance companies file in each state in which they do business; copies of this statement are also voluntarily submitted to the A. M. Best company in order to obtain an A. M. Best rating. Questionnaires are used to obtain further information such as management structure and reinsurance agreements. Information is also obtained from industry organizations and associations and from direct contact with the companies.

The data is input to the A. M. Best databases and is exhaustively crosschecked to make it as accurate as possible. When it is "clean" it is analyzed for profitability, leverage and liquidity. Industry aggregations and statistics are compiled. The analysis is used, along with the knowledge of the company and the industry, to arrive at a rating for the company. The rating is presented to the company to make sure that no information was overlooked. The rating is then published.

When the database is complete the many data-oriented products can be produced and released.

DATA SERVICES

The Data Services department is responsible for the computer support for many of these products. Organizationally the department consists of a programming group and a group of applications analysts. The programming group provides and supports much of the software used by the analysts.

The programming group uses a mix of FORTRAN, COBOL, and PL/I. The Data Services analysts come from a variety of educational backgrounds, such as business, mathematics, statistics, computer, philosophy and teaching to name a few. Many are hired into an entry level position right out of school - often with very limited computer background. Several years ago we put together a training manual as our primary training vehicle. Prior to that training was strictly by immersion.

TRAINING

Training of the Data Services Analysts relies heavily on the Training Manual. The training manual consists of some 20 plus assignments using all of the software that an analyst is expected to use. This includes our internally developed programming - the "FIM" or Financial Analysis system, CMS commands, OS/MVS JCL and last but not least, the SAS system. The training assignments were put together by the analysts themselves and progress in an orderly fashion through this material.

The SAS system training is interwoven, with the other material and consists of reading assignments in the base SAS software manuals and other references and structured exercises using the A. M. Best file structures. A very supportive atmosphere is provided within the group so that an analyst-in-training can seek help from any other member of the staff. Usually within a week the analyst is beginning to produce useful work; the formal training will last about 6-8 weeks on the average.
THE SAS SYSTEM AT A. M. BEST

Interestingly enough, the SAS system was acquired by A. M. Best to facilitate the processing of OS SMF accounting records, a task for which it is still being used today. Today we use the base SAS software, both on OS and CMS, and SAS/GRAPH*. Several examples of our use of the SAS system will follow; they are by no means an exhaustive treatment of all of our applications.

OS JOB STREAM DEVELOPMENT

The first example that I would like to share with you today was the use of base SAS software to support a major redesign of an existing system. Over the years, the design and flow of the Property Casualty Best's Executive Data Service (PCBEDS) had gone through many revisions and had become a very confusing set of programs, jobs and files. It was decided to overhaul it and after a review a design was chosen in which the data would be converted to a file format that could be maintained throughout the entire process. The final product in this case was to be a magnetic tape containing approximately 450,000 records of by line / by state data from page 14 of the annual statement - each record representing one state/line combination. This tape would then be the direct basis for producing the corresponding book.

For each record there are six data items: direct premiums written, direct premiums earned, etc. for that state-line. Other values such as various ratios, ranking, and market share are calculated from this data and from the overall population. In addition, codes are used to help categorize the companies. Single companies, which are members of a company group, are consolidated to produce a record for the group.

The nature of the data and the process strongly suggested a sequential flow since each record would have to be processed to calculate each new data value. The flow consisted of an initial conversion from the data input format followed by many steps of passing the fixed record format through programs which calculated another set of data to be added to that record. It quickly became evident that it would help a great deal if a proof of the output file and simply print them out using a PROC PRINT. Since all the records had the same format this was very easily accomplished by inserting this JCL step multiple times changing only the input data set name and the title to identify the output. When the development was completed the SAS system proof steps were left in the job JCL but were converted to comment statements. In this way they did not execute in production but could always easily be "turned on" again should the need arise.

This product also required the categorization of each record in terms of a "ratio class", which simply stated is the number of standard deviations that particular record differed from the mean for the adjusted loss ratio, one of the calculated ratios. The SAS system was used to calculate the standard deviation, using PROC MEANS, and make this data available to a subsequent program in the process.

Another product in this product area required the calculation of a log-linear growth rate for direct premiums written over a span of years. A SAS system procedure was written to accomplish this directly. It was called GROWLL.

This job stream was eventually used to develop 10 years of magnetic tapes containing data on single companies, group companies and industry total companies. A requirement then arose for a file containing only the "totals" companies, from each of these files, to be placed on a single file. After just a few moments of thought, we adopted the following simple solution. We simply concatenated all the files on the input to the SAS system as one composite data set and used a subsetting IF to select the desired records for the output file. We processed 10 files of about 400,000 records each - 4,000,000 records total - in just a couple of hours.

FILE CONVERSION - STANDARD TAPES

As noted above, Standard Data Tapes are one of the products available from A. M. Best. Most of these tapes are produced in one of the standard internal data formats used within the company. The "Regular" format is a company/year record for a given company made up of several sub-records called sections, with 28 data items per section, in addition to some basic identifying data. Over the years this has been found to be a flexible and workable record format for our internal processing.

Some clients, however, find it difficult to work with this format for various reasons, such as hardware or software
incompatibility. In those cases, a format conversion can usually be accomplished using the SAS system. The data is simply read in with one format and written out with another. In this way, records with double precision (RBB) data fields can be converted to single precision (RB4), display (zoned decimal), packed decimal or some other format, or the individual sections can be regrouped into one long record which makes it easier to load into a 4GL's. In other cases data can be combined (merged) from unlike files, such as name address data (character) and financial data (numeric).

The SAS system also makes it easy to read in several records from a file and through PUT statements or a PROC PRINT, produce a proof print to be shipped along with the data tape. Indeed we suggest to our users that the SAS system is one of the commercially available software products that make it easy to get at the data on our data tapes in order to do an analysis.

The Standard Data Tapes have User's Guides that describe the data content and format of each tape and also include examples of programs in FORTRAN and the SAS system that were written to illustrate how the data can be accessed.

In addition to Standard Data Tapes, we produce many custom data tapes for clients. The SAS system, together with our other software, makes it possible to, in most cases, readily access the data and extract it and manipulate it to satisfy these custom requests.

REPORTS - STANDARD / CUSTOM STUDIES

A whole series of standard reports on paper of various financial topics, such as marketing, expenses, investments, premiums, operating results, cashflow analysis, etc. are also available. These reports may be pulled from a multitude of base files and combined into one meaningful report. The Data Services analysts have developed SAS systems and internal procedures to accomplish this. These are usually pre-canned and require the input of a set of parameters to identify the particular subset of the data desired. The same techniques are applied to custom reports.

MICRO DATA SETS

The SAS system is also used by the analysts in the process of creating MICRO data sets. The programming group developed a generalized procedure to convert any data in our existing files to either DIF or WKS format. The generality of the procedure is made possible by front ending the process with the SAS system.

With the SAS system we can readily access files, merge data, and convert it to a display format in the first step. The second step in the procedure is a PL/I program that converts the data to DIF or WKS format. The output of the MICRO program is placed onto a tape for direct loading onto a diskette via a PC, or it is placed on OS/MVS owned disk packs, accessed from CMS, and then down loaded via an IRMA board to a diskette.

Once downloaded to diskette, a WKS file is input into LOTUS 123 and column headings are input before shipping the diskette to a customer.

An example of this process, is the downloading of Property Casualty BEDS A2 data to a micro diskette. A file of the data in the final book form is captured at the time of book production. This is then accessed with the SAS system to select the desired states and lines, sort as required, and output to a display tape.

Procedures have been developed for a whole host of standard micro data sets.

NEWSLETTER - BIMR

Best's Insurance Management Reports is a weekly insurance management oriented newsletter which is produced for both the property/casualty and life/health industries. The Online Reports section of the newsletter combines text, statistics and graphics to report insurance industry studies to the readership.

Of course the SAS system is used to gather many of the statistics used in this publication, but of particular interest is the use of SAS/GRAPH. Naturally Bar charts and line graphs lend themselves to reporting financial information. In addition maps, tower charts, and even raised maps have been used.

In many cases the chart is redrawn for a better graphic presentation. With maps this is typically not the case because of the amount of work that would entail. A MacIntosh microcomputer is finding increasing use as a competitor or at least a supplement to the SAS system graphics.

DATA ANALYSIS - BARR REPORTS

In the analysis of the data, the BARR (Best's Advance Rating Report) is an example of some major coding. This report lists several key data values and ratios describing the profitability, leverage and liquidity of an insurance company. The data for this report is pulled from six years of data files. Over 4500 lines of base SAS system code
are required to achieve the final results.

The calculations include some simple calculations, five year totals and averages, and rely on several built-in SAS system functions such as ROUND, SUM, MEAN, MAX, MIN and ABS. Large arrays are used in the calculations - sometimes several arrays within a calculation. One of these calculations (for 5 years) is so complicated that over 1200 lines of SAS system coding is required; the calculation requires hundreds of constants, several screens, several ratios and great deal of array manipulation.

The financial part of the report is subdivided into several groups of information: operations data, profitability tests, reinsurance leverage tests, balance sheet data, liquidity tests, loss reserve data, loss reserve tests, cash flow tests, and Best's Rating and Financial Size Category.

DATA ANALYSIS - RATING SHEETS

The Rating Sheet is a compilation of many data values, ratios and summary statistics on a company. It is one of the tools used by the A. M. Best insurance analysts to review a company for an A. M. Best rating. The SAS system coding is very similar to the BARR report, except that it is primarily a 1 year report; it does require 6 years of data to develop some values. The Rating Sheet provides a very comprehensive and in-depth look at the financial performance and status.

OTHER

The SAS system has found its way into much of the processing that we do, a testimony to its ease of use and applicability. There are times, of course, when like any language it gives an obscure error message or it doesn't perform as expected or described. The SAS system has earned the reputation of being better than many other languages in this respect.

The last application that I would like to mention today, is the one that I mentioned first - SMF analysis and accounting. Yes we are still using the SAS system for that original reason for bringing it in-house.

CONCLUSION

The SAS system has clearly has an impact on many parts of our business. It has been a good impact. It is a success story!