Techniques for Maximizing Profits in Litigation Engagements

CPA Litigation Service Counselor

A HARCOURT BRACE PROFESSIONAL PUBLICATION

VOLUME 1995, ISSUE 4, APRIL 1995

IN THIS ISSUE

PART I IN A SERIES

Graphics and Computer Technology in Litigation

BY PETER SCHULMAN, CPA

Editor's Note: This is the first in a series of articles on the use of graphics in litigation services engagements.

Over the next few issues of *CPA Litigation Service Counselor,* we will cover several uses of graphics in litigation consulting. We will start with trial graphs, then discuss analysis graphs, a fairly new but important concept as it relates to litigation consulting.

Much of the information we communicate during the course of our work is not limited to graphs. For example, financial statements, forecasts, and schedules are frequently included in our presentations. We will explore the presentation of textual materials (*i.e.,* numbers and words) along with graphs.

TRIAL GRAPHS—CASE STUDIES

Trial graphs are frequently used by testifying experts as demonstrative evidence. The purpose of trial graphs is to communicate concepts in an elegant way, so that the concepts can be understood as intuitively as possible.

There are four types of graphs generally used in trial: bar charts, line charts, area charts, and pie charts.

Bar and line charts are the chart types used most frequently. There are also combination charts—for example, I sometimes use combination charts which include bars and lines.

The key elements of graphs are data series, axis, and design elements. At a minimum, all graph types require data series, which are the

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graph elements that represent the underlying data (for example, bars, lines, and pie slices). Also, bar, line, and area charts require x and y axes, the horizontal and vertical lines bordering the plot area. Some three–dimensional graphs require a third axis. Design elements include titles, legends, axes, gridlines, text boxes, lines, and arrows.

BAR CHARTS

To illustrate the use of bar charts, we will look at the case of Flashlight USA, the exclusive distributor of flashlights in Europe for a major name brand flashlight manufacturer through 1987. In 1988, the flashlight manufacturer changed Flashlight USA's distributorship from exclusive to non–exclusive, and the manufacturer began competing with Flashlight USA. In 1990, the manufacturer terminated Flashlight USA's distributorship. Flashlight USA sued the manufacturer for lost profits damages. We were retained by Flashlight USA, the plaintiff in the case.

Figure 1 represents a forecasted income statement for Flashlight USA. The forecasted income statement in Figure 1 was part of our foundation for the lost profits claim. Figure 2, a stacked bar chart, is a graphic representation of Figure 1. Note that in Figure 2 the height of each bar represents the gross sales in Figure 1. The bottom "slice" of each bar represents forecasted earnings, as indicated on the legend to the right of the graph. If we were preparing for a case, although the graph in Figure 2 would have been suitable, color would have been better. Color presentations are generally more effective, easier to understand, and more pleasing to the eye than black–and–white presentations.

In the actual trial documents, the bars in Figure 2 were flashlights,

Flashlight USA, Inc.
Forecasted Statement of Operations
For The Six Years Ended June 30, 1993

	Assum	Year Ended June 30 1988	1989	1990	1991	1992	1993
Gross Sales		4,881,000	6,842,000	8,804,000	10,765,000	12,727,000	14,688,000
Cost of Sales	83.8%	4,090,000	5,734,000	7,378,000	9,021,000	10,665,000	12,309,000
Gross Profit		791,000	1,108,000	1,426,000	1,744,000	2,062,000	2,379,000
Operating Expenses	3.7%	181,000	253,000	326,000	398,000	471,000	543,000
Income From Operations		610,000	855,000	1,100,000	1,346,000	1,591,000	1,836,000
Pro–Forma CEO Compensation		110,000	135,000	142,000	211,000	222,000	233,000
Forecasted Earnings		500,000	720,000	958,000	1,135,000	1,369,000	1,603,000

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Figure 1

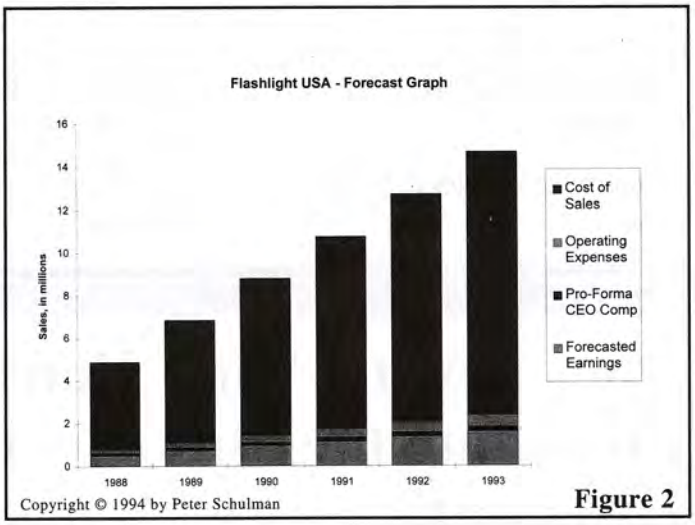

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Figure 2

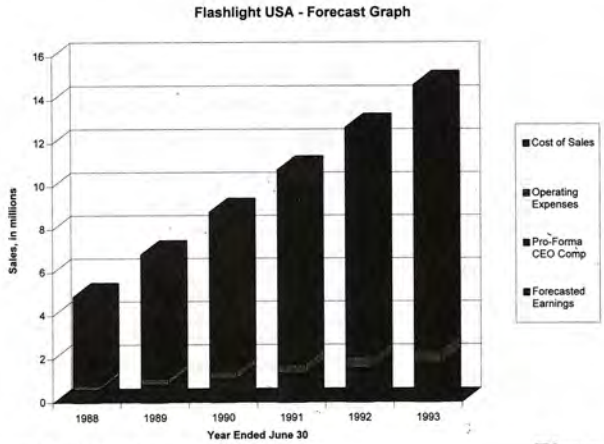

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Figure 3

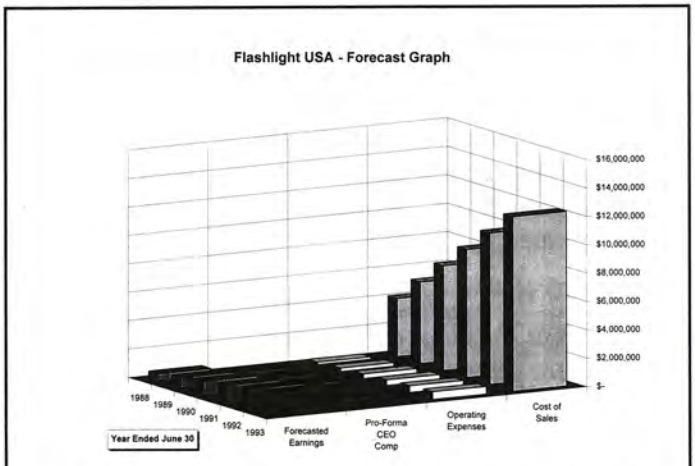

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Figure 4

and the flashlight bases represented forecasted earnings. This approach made the graphs more interesting and entertaining for the jury (there were a few chuckles out of the jury box as I explained that the bars were flashlights). We had a similar chart for the income statements where the height of the flashlights represented actual sales, and the flashlight bases represented net income (and losses for the loss years). Each of the two charts had transparency overlays, mounted on steel pegs, which only had the flashlight bases on them. The difference in the height of the flashlight bases on the forecast and income statement graphs represented the damages.

Near the end of my direct examination, I lifted the transparencies off of their respective graphs and placed them on a third graph, which was blank except for the horizontal and vertical axes which were identical in scale to the forecast and income statement graphs. The difference in the height of the flashlight bases on each of the two transparencies was a graphic display of the damages, the difference between forecasted earnings (what the earnings would have been "but for" the alleged damage) and actual earnings. This approach allowed us to graphically and intuitively communicate the concepts of forecasted earnings and actual earnings and the difference between the two as a measure of damages.

Now let's consider some design alternatives to the bar chart shown in Figure 2. Figure 3 is also a three–dimensional graph of the forecast in Figure 1. One of the interesting aspects of trial graphics is that they are a combination of art and science, and the selection of charts in Figures 2 or 3 is a matter of preference and style.

The elements that give rise to the 3–D effects of the graph in Figure 3 are called non–data ink, primarily because they do not add anything of quantitative substance. Non–data ink is not necessarily bad when used appropriately and in good taste. However, it is important to recognize the existence of non–data ink because it can turn into "chartjunk," which we will cover in more detail when we discuss graph design concepts.

Figure 4 is an unstacked bar chart. While this graph is not an effective alternative to Figures 2 or 3 for the presentation of the underlying forecast, it could be used to supplement the stacked column chart(s) to explain an individual element of the forecast in relation to the other elements. For example, pro–forma CEO compensation in 1993 was forecasted to be $233,000. That may sound like a lot to jurors, but the graph in Figure 4 could be used to show what $233,000 looks like in

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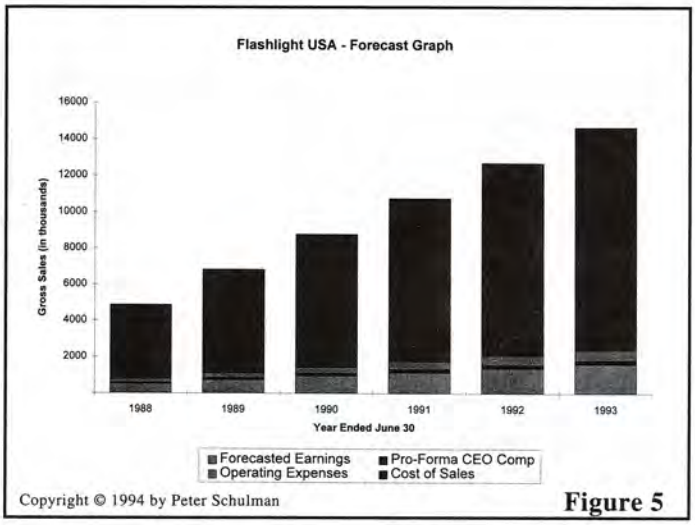

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Figure 5

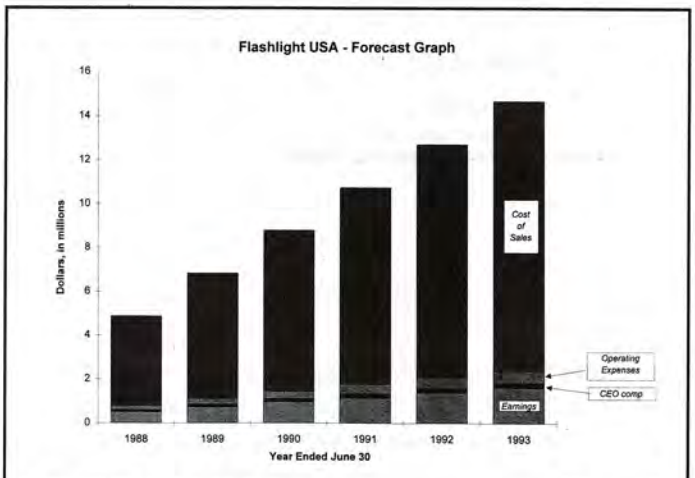

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Figure 6

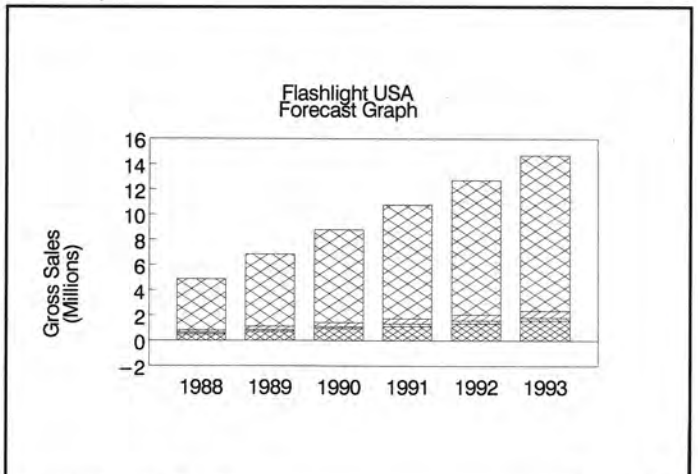

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Figure 7

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Graphics

relation to the other elements of the forecast.

If we were to take a "do's and don'ts" approach to illustrating graphics, the charts in Figures 2, 3, and 4 could be "do's." Now let's take a look at some "don'ts," namely, Figures 5–7. The graph in Figure 5 is the same as the graph in Figure 2 except the legend has been moved from the right side to the bottom of the graph. Bar charts with side legends are easier to understand because the legend contents are in the same order as the slices of the bars. The graph in Figure 6 is the same as the graph in Figure 2 except the legend has been replaced with graphic annotations (text boxes with lines and sometimes arrows). As a general rule, for bar charts, legends are better than annotations.

The graph in Figure 7 is a graph of the data in Figure 1 (quantitatively the same as the graphs in Figures 2–6); however, its visual similarity to the other graphs is almost imperceptible. What are the differences? The finely shaded areas in Figures 2–6 have been replaced by crude cross–hatchings in Figure 7. Attractive fonts (typestyles) have been replaced with large, clumsy, and unattractive fonts. Fine lines making up the various elements of the graph (bars, axes, borders, legend, etc.) have been replaced with crude lines.

How can stacked bar charts of exactly the same data have such a different impact on the viewer? The answer lies primarily in the differences between the technologies used to create the graphs. The graph in Figure 7 was prepared using a DOS program, whereas the graphs in Figures 2–6 were prepared using a Windows program. Later in this series of articles we will discuss computer technologies, particularly as they relate to graphics and litigation consulting.

STAY TUNED

Part II of this series, scheduled to run in the May issue of *CPA/LSC*, will cover line charts, area charts, and pie charts.❖

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PART II IN A SERIES

Graphics and Computer Technology in Litigation

BY PETER SCHULMAN, CPA

Editor's Note: This is the second in a series of articles on the use of graphics in litigation-services engagements.

LINE CHARTS

In Part I of this series on bar charts we introduced Figure 1 *(see CPA/LSC April 1995)*, a forecasted income statement that was part of the foundation for our testimony. The jagged line on the graph in Figure 8 *(see page 2)* represents the actual sales for Flashlight USA. The straight line in Figure 8, a linear regression of the monthly sales during the first 24 months shown on the graph, is a graphic representation of forecasted sales from Figure 1.

Compare Figure 9 *(see page 2)* to Figure 8. Note that the annotations in Figure 8 have been replaced with a legend on the bottom of the graph in Figure 9. Also note that Figure 9 has horizontal and vertical grid lines.

As you can see by comparing Figures 8 and 9, as a general rule, annotations are better than legends for line charts. Also, legends are a form of non-data ink and can make graphs appear busy. When I first began speaking on the subject of graphs, I recommended not using gridlines. I was surprised to learn that many CPAs preferred graphs with gridlines because it is our nature to want to analyze data and graphs. It's important to keep in mind, however, that trial graphs are generally prepared for non–CPAs, and that they are intended to communicate and emphasize concepts and trends, rather than specific quantitative information. Gridlines can also conflict with annotations. Although I have a strong preference for graphs without gridlines, you may want to use gridlines. In that case, perhaps a better alternative to

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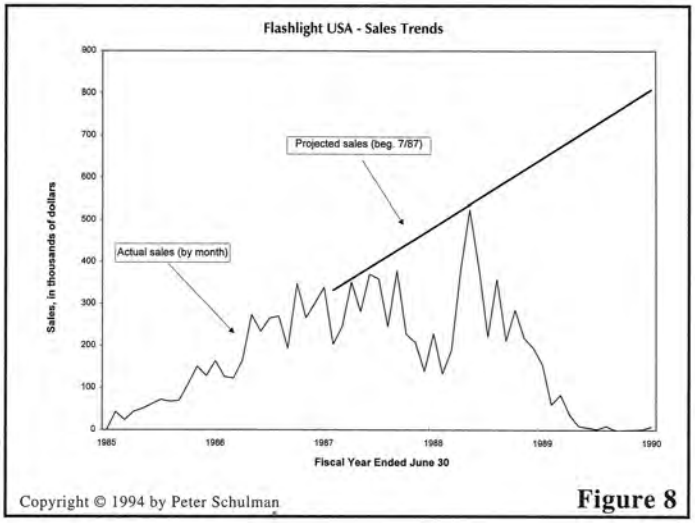
vertical and horizontal gridlines is one or the other, but not both, as shown in Figure 10 *(see below)*.

Area Charts

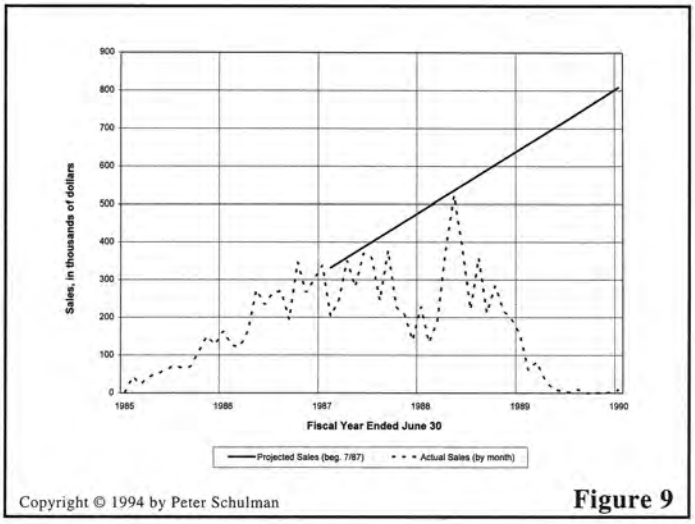
I Scream USA was sold in 1986. The buyer subsequently defaulted on the note claiming that sales had fallen significantly short of the expected revenue levels. The buyer claimed to have relied on sales projections compiled by the seller's accountants, and that the sales projections were not reasonable. We were retained by the purchasers. The principal purpose of the graphs is to show that the seller's accountants' forecasts were unreasonable.

Figure 11 is an area chart of the sales for I Scream USA. The areas with the embedded text boxes represent actual sales. The area on the right side of the graph with the arrow pointing toward it represents forecasted sales. The subject matter of the graph on Figure 11 was whether or not the forecast was "reasonable." Based on the actual sales from 1982 through 1986, the graph strongly suggests that the projected sales are not consistent with the actual sales trends.

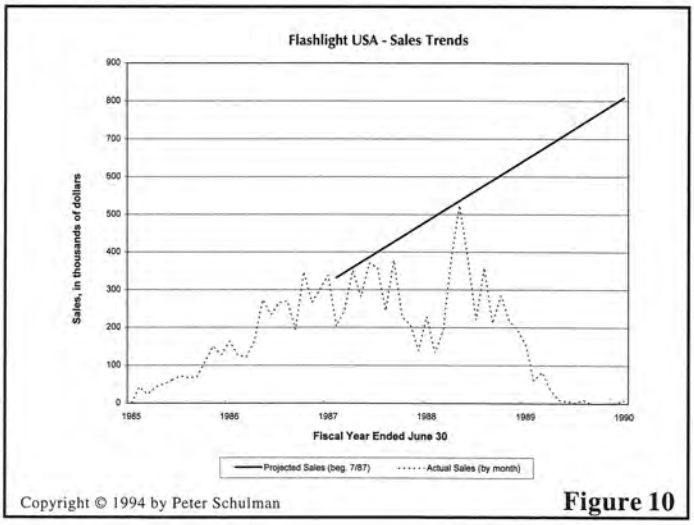
Normally, under similar circumstances, conclusions regarding what would be a reasonable forecast would be similar to "Monday morning quarterbacking" because the actual sales results during the forecast period would be known at the time of litigation. In this case we did not know what the actual sales were during the forecast period, so we prepared our own forecast based on prior years' sales. The additional area on Figure 12 *(see below)* shows the results of our forecast. When we eventually received the actual sales for the forecast period, our forecasted sales were close to the actual sales,



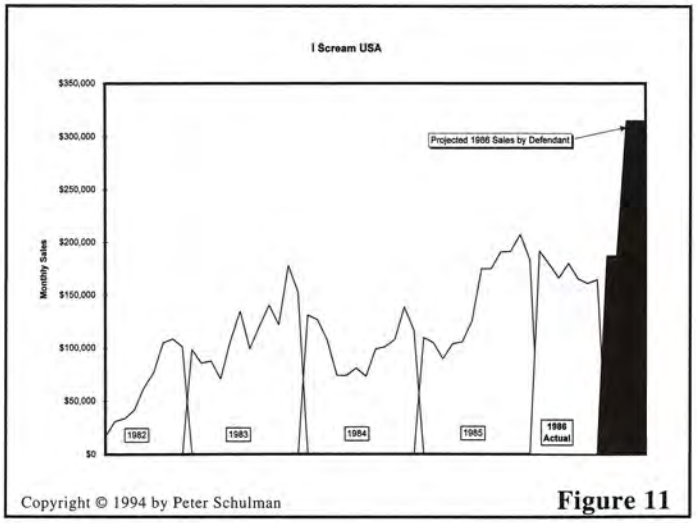
Copyright © 1994 by Peter Schulman **Figure 8**



Copyright © 1994 by Peter Schulman **Figure 9**



Copyright © 1994 by Peter Schulman **Figure 10**



Copyright © 1994 by Peter Schulman **Figure 11**

as shown on Figure 13 *(see page 3)*.

The chart in Figure 14 *(see page 3)* is an example of a 3–D area chart. Color is particularly effective with 3–D. Also, with the use of a presentation graphics program, areas can be revealed one at a time or in groups as moving pictures to tell a story sequentially. For example, we could start by showing the areas representing actual sales, then reveal the areas representing forecasted sales as moving overlays.

As frequently happens in these types of cases, which are based on a multitude of documents including financial statements, tax returns, a forecast, and accountants' workpapers, the attorneys were arguing for months over whether or not the estimates during the forecast periods were "reasonable."

After we submitted our graphs, the issues became intuitive. Like many cases involving accounting or economic experts, this case involved an *income stream* and *trends*. The graphs speak for themselves—the area representing forecasted sales towers over the other data. Visually, it can be easily determined that the CPA's forecast is not part of a trend based on prior sales. The case settled the week we submitted our graphs. Our client and the attorney we worked with were pleased, and both parties saved thousands of dollars in litigation costs.

Pie Charts

CPA expert witnesses seldom use pie charts, although I used them once in a case regarding convertible debentures. AFS was a lease broker that specialized in large lease financing transactions. The fees earned by AFS typically included residual value interests in the leased property. The company had borrowed $750,000 from a large bank in the form of a convertible debenture. The de-

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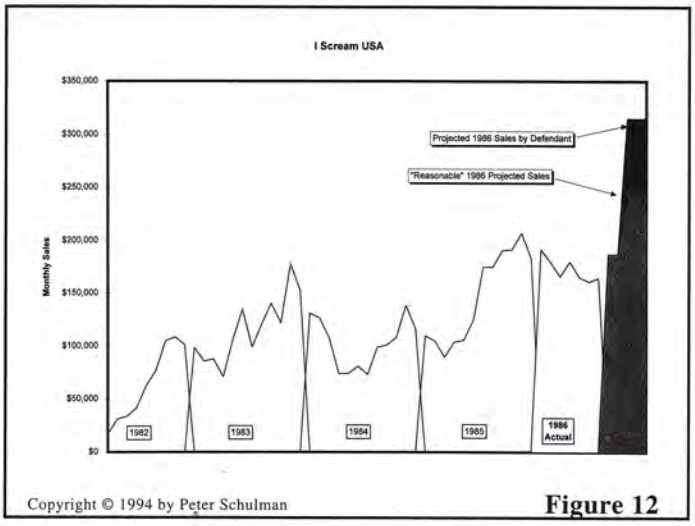

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Figure 12

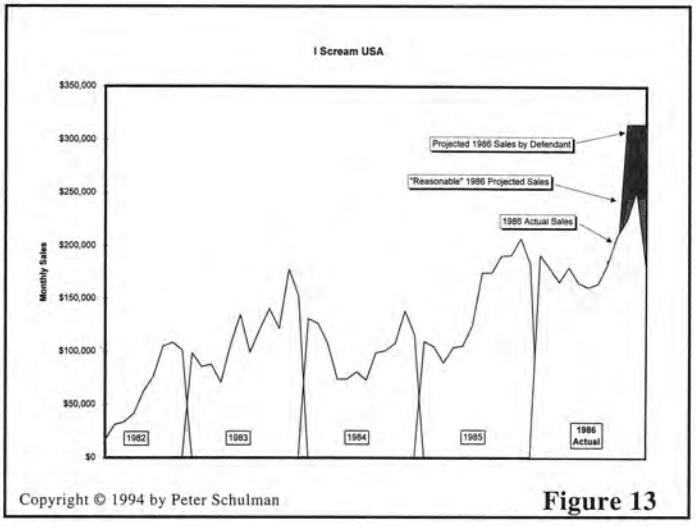

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Figure 13

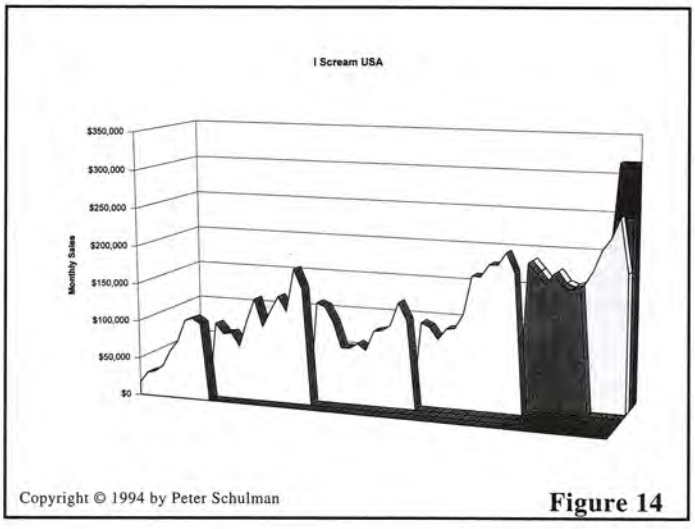

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Figure 14

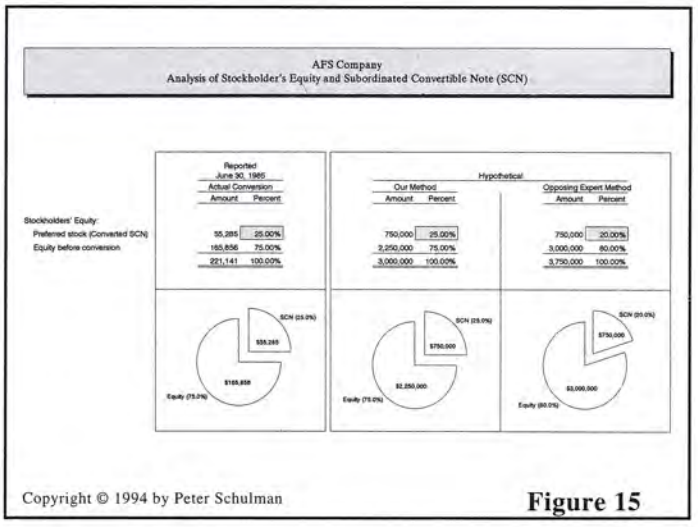

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Figure 15

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benture was to be automatically converted into non-voting preferred stock based on the company's retained earnings, before conversion, at a 3-to-1 ratio. To the extent that the debentures had not converted by the due date, the balance of the loan would have to have been repaid. One of the many key issues in the case was the algebra of converting the debt into equity on a 3-to-1 basis. This is reminiscent of many of the kinds of word problems people had in basic algebra. We were retained by AFS and it was our position that it would take $2,250,000 of retained earnings to convert the entire $750,000 note. The opposing expert, for reasons we could never understand, thought it would take $3,000,000 to fully convert the entire amount of the note into preferred stock. This was significant because AFS had reached retained earnings of $2,250,000, but it had not reached $3,000,000.

There was actually one conversion before the dispute between the parties erupted. At the end of the year ended June 30, 1985, equity before conversion was $165,856, and $55,285 of the convertible debenture was converted into common stock. The financial statements for that year also were reviewed by AFS's accountants, one of the Big 6 accounting firms.

Figure 15 *(see page 3)*, one of our trial exhibits in this case, contains three pie charts and the related data for each chart. The chart and the data on the left are a summary of the actual conversion. The chart in the middle represents our opinion that $2,250,000 of equity was required to convert the entire $750,000 of debt into preferred stock. Note that the pie charts on the left and in the middle show clearly and intuitively that the actual conversion and our opinion regarding full conversion is based on a 3-to-1 ratio of equity to debt.

The chart on the right in Figure 15 represents the other expert's opinion that $3,000,000 of equity was required to convert the entire $750,000 of debt into preferred stock. Note that the pie chart shows that this opinion is based on a 4-to-1 ratio of equity to debt, and it graphically draws attention to the differences between the opposing expert's opinion, our opinion, and what actually happened when there was a partial conversion.

The opposing expert was caught by surprise. By the time our client's attorney was through with him, he not only lost the issue, but his entire credibility was so badly damaged that the rest of his opinion carried little or no weight.❖

Next Month—Combination charts.

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PART III IN A SERIES

Graphics and Computer Technology in Litigation, Part III

BY PETER SCHULMAN, CPA

Editor's Note: This is the third in a series of articles on the use of graphics in litigation services engagements.

COMBINATION CHARTS

Combination charts can combine the elements of bar, line, and area charts. For example, I recently used a combination chart on a preferential distribution case (Figure 16, see page 2). ABC was a retailer of electronic equipment that filed for bankruptcy in August 1992. One of ABC's major suppliers was Moresell. The trustee in bankruptcy alleged that Moresell received preferential distributions from ABC prior to the bankruptcy.

For those who may be unfamiliar with bankruptcy cases, companies facing bankruptcy sometimes attempt to pay off some creditors to the detriment of others. To the extent that such payments occur within 90 days before filing for bankruptcy, referred to as the "preference period," the trustee in bankruptcy may sue the recipients of such payments to recover them for reallocation among the creditors. It is not sufficient just to show that payments were made within the 90-day period. It must be shown that they were, in fact, preferential. One of the ways to demonstrate the preferential nature of the payments is to show that there was a change in the normal course of business between the debtor (ABC) and the creditor (Moresell) during the preference period.

We were retained by the trustee

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to demonstrate that there was such a change between Moresell and ABC during the 90-day preference period. To do this we gathered transaction information including all the payments from ABC to Moresell for more than a year preceding the date of filing for bankruptcy.

Figure 16 shows both the average weekly check amount(s) and the numbers of checks written per week. One glance at this chart shows that ABC dramatically increased the frequency of its payments to Moresell within the preference period.

The heavy line on Figure 16 is the average weekly check amount(s) paid by ABC to Moresell. The bars are the weekly numbers of checks written by ABC to Moresell. Note that Figure 16 has two "*y*" (vertical) axes, one on the left and one on the right. The left axis goes with the line, and the right axis goes with the bars. For example, looking at the last bar on the right and reading the scale on the right vertical axis, ABC wrote Moresell six checks during that week.

Note the beginning of the preference period (5/21/92) shown on the bottom right of Figure 16 with a text box and an arrow pointing up. Figure 16 tells a very compelling story about the change in the normal course of business between ABC and Moresell. Before the beginning of the preference period, ABC generally wrote one check per week to Moresell, and occasionally wrote a maximum of two checks per week. During the preference period, ABC wrote as many as six checks per week to Moresell, with five checks being the most common.

Keep in mind that you are looking at a very small version of this trial graph, which was blown up to 40 x 60 inches for trial. When graphs like this are blown up to very large sizes, they can be easily read, and their visual impact can be quite powerful.

The four annotations in the upper right hand corner were additions made by the attorney on the case to harmonize the story told by the graph with other facts in evidence. Notice the design elements used for the annotations. The text box on the bottom right, indicating the beginning of the preference period, uses a drop shadow. The four text boxes in the upper right-hand corner have rounded corners.

Analysis Graphs—Case Study

When we think of graphs, we generally think of trial graphs, which are intended to communicate facts and concepts so they can be easily understood. Graphs can also be used to supplement our analysis. As a matter of fact, graphs can and should be an integral part of our work product, particularly when the quantitative issues are complex. We refer to such graphs as "analysis" graphs.

Analysis graphs differ from trial graphs in that they are not prepared primarily to communicate. The primary objectives of analysis graphs are:

1. Understanding the data
2. Exploration
3. Tabulation

Downtown Bookstore (Downtown) is a well-established magazine, newspaper, and bookstore in the San Francisco Bay Area. During the devastating October 1989 San Francisco Bay Area earthquake, bricks from the building next to Downtown Bookstore were shaken loose, creating a safety hazard. The bookstore was closed by the city, and the neighbor took ten months to complete repairs to their building.

Although Downtown was able to

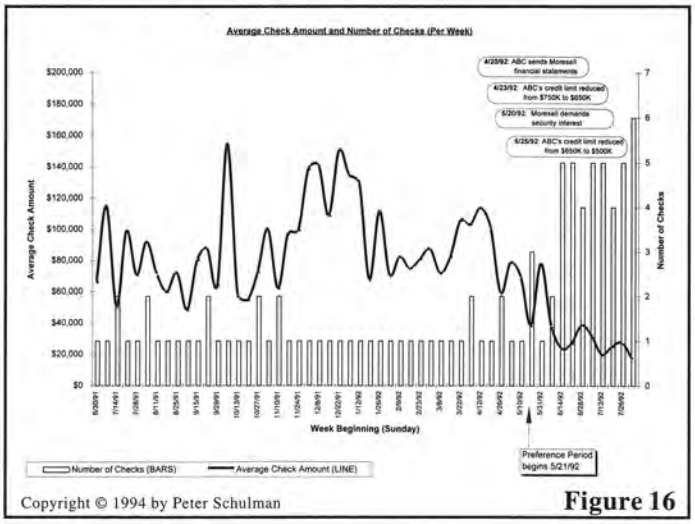

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Figure 16

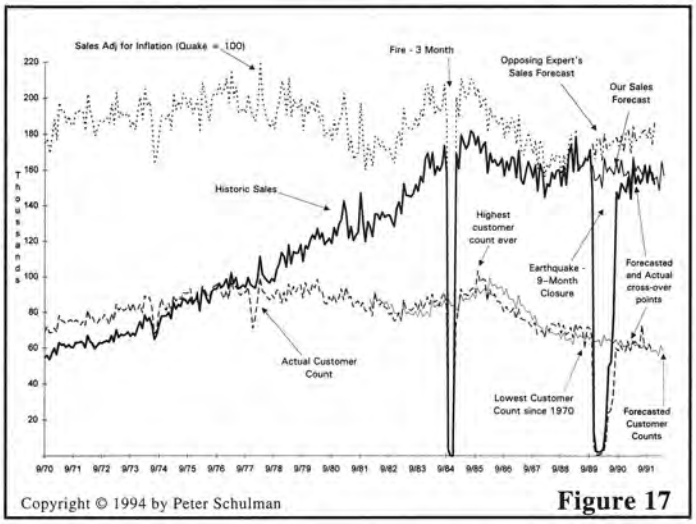

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Figure 17

open in a temporary location shortly after the earthquake, it was unable to reopen in its original location for the entire ten months, at which time sales were significantly less than they were before the closure.

One of the significant aspects of this case was that in October 1984 the bookstore was closed for three months due to a fire. Upon reopening, sales resumed at higher levels than existed before the fire.

We were retained by the defendant, the owner of the building that sustained the earthquake damage. Downtown claimed that the building repair delays were unreasonable and that the building could have been repaired in three months or less. Based primarily on the 3-month fire closure, Downtown's accounting expert claimed that sales would have continued upward if the building had been repaired within three months, and Downtown would have been favorably impacted by the recession because their business was counter-recessionary. The opposing expert's analysis resulted in a 15-year lost profits damage claim.

Figure 17 (see page 2) represents an analysis graph of the case. The data in this case spanned across 20 years. The data represented on this graph is outlined as follows:

1. Historic sales
2. Customer counts
3. Sales adjusted for the effects of inflation
4. Three-month fire closure
5. Ten-month quake closure
6. Actual sales after the quake
7. Opposing expert's sales forecast
8. Our forecast of customer counts
9. Our sales forecast

The plaintiff and it's expert believed sales had been growing continuously for 20 years. If you look at the historic sales line on Figure 17, you will see why he thought that. In fact, when we initially tabulated and graphed historic sales we also thought this was the case. However, when we plotted sales adjusted for inflation on the same graph, we could see that real sales had, in fact, been declining since 1985. This major revelation led us down several other productive paths and illustrates that one of the main values of an analysis graph is to help figure out what is really going on.

Locate the heavy line called "historic sales" on Figure 17. As you follow it to the right, notice the first trough created by the three-month closure due to the fire. After the fire, note that sales quickly rebounded and continued upward for several months. Continue following the historic sales line to the right and notice the second trough created by the 10-month closure, after which sales resumed at levels substantially below pre-quake levels. On the right side of the graph, locate the opposing expert's forecast. As you can see from the actual sales trend before the quake, his forecast was based on sales growth just before the quake. Superficially, this looks like a plausible foundation for a damages claim.

Now look at the dotted line called "sales adjusted for inflation" and compare it to the historic sales line. What looked like rapid growth during the 1970s and early 1980s was not actual growth, but rather the effects of inflation.

When we obtained access to the sales journals, we noticed a column called "customer counts," which was the monthly total of the number of register rings. At that early stage of our work, we did not know how or if the customer counts would be useful to us, but we decided to enter the information into our database since it was readily available.

Locate the dashed line called "actual customer count." Notice how

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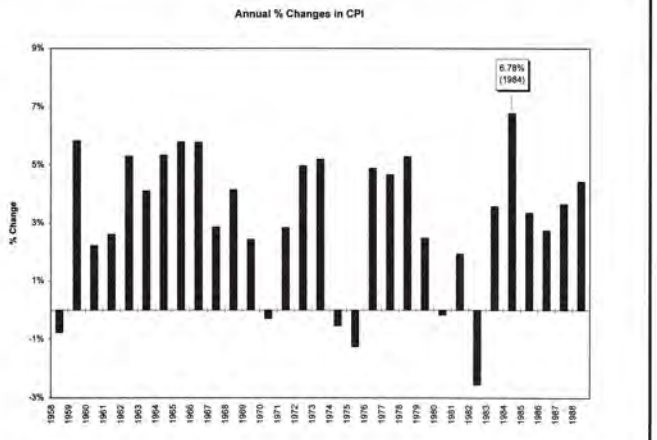

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Figure 18

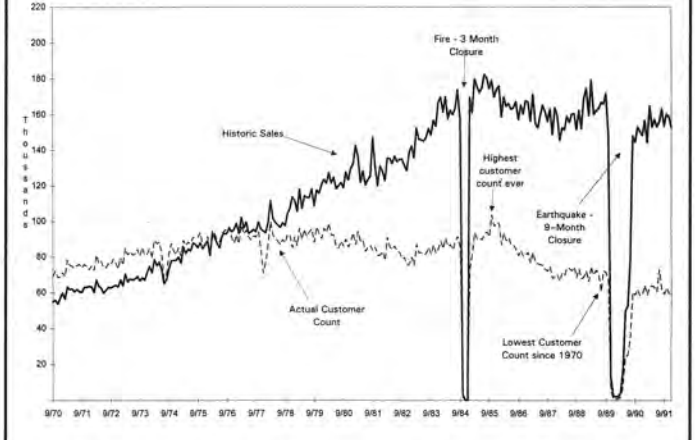

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Figure 19

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the customer count line follows the trend of the inflation-adjusted sales line. Note that before the fire, the customer count line was increasing or flat (depending on when you start measuring the trend). Shortly after the fire, customer counts increased to the highest count ever (approximately 100,000 customers per month) and then headed steadily downward for approximately four years preceding the quake (to approximately 60,000 customers a month, or a 40% decrease since the high shortly after the fire).

The fourth quarter of 1989, when the quake hit, was also the beginning of the recession of the 1990s. Part of the opposing expert's hypothesis for the forecasted sales line after the quake was his belief that Downtown was counter-recessionary. In other words, even though the post-quake period marked the beginning of an economic downturn in Northern California, the opposing expert justified his forecast that sales would increase sharply by stating his belief that the recession would enhance Downtown's sales. At the opposing expert's deposition, he said, "The business probably does better in an economic downturn than it does in an upturn." When asked, "What is your basis for saying that?" he replied, "Their sales in '82, '83, and '84, which was a recession, were very good."

Now look at a graph of the annual percentage changes in CPI from 1958 through 1988 on Figure 18. Although the expert's working hypothesis was that the business was counter-recessionary, the data suggests that the reverse was true. In 1984, the year of the fire, there was not a recession. As a matter of fact, 1984 was the height of the expansion of the mid-1980s. During 1984, GNP increased by 6.78%, the high-

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est annual increase since 1958, as clearly shown on Figure 18 (see page 3).

The key questions are: Why did the opposing experts make these mistakes, and what does this have to do with analysis graphs? The opposing expert made these mistakes primarily because he didn't fully understand his data. He did not understand the relationship between inflation and nominal sales; he did not include the customer counts in his analysis; and he did not understand the relationship of the economy to his data and the subject business.

We understood the data largely because we used analysis graphs to understand the raw data, which, in this case, was 12 dense pages of spreadsheet schedules. As the graphs and the preceding case narrative suggest, the analysis graph of the data served as a road map to our ultimate conclusions.

Analysis graphs can also be turned into trial graphs. Because the case settled on terms very favorable to our client, we did not prepare trial graphs in the case of Downtown Bookstore, but there are several things we could have done to turn the graph in Figure 17 into a trial graph.

First, we could have started with a large graph showing only the historic sales and customer count data, as shown in Figure 19 (see page 3). We could have then added each additional data series (each line representing new data) individually, using color transparency overlays. If we wanted to simplify the trial graph further, we could have eliminated some annotations or removed each transparency before successive ones, so that only one transparency was visible at a time.

As CPAs, we frequently pride ourselves on our ability to understand quantitative information. However, analysis graphs will enable you to understand your data better, discover subtleties in the data, ask relevant questions, and arrive at sound, unimpeachable conclusions.

Analysis graphs have another major benefit—they make it easier to explain your work to attorneys. Using analysis graphs will contribute to a more pleasant and harmonious working relationship.❖

Next month—When to use a particular type of graph, and the technology used to create graphs.

Techniques for Maximizing Profits in Litigation Engagements

CPA Litigation Service Counselor

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IN THIS ISSUE

PART IV IN A SERIES

Graphics and Computer Technology in Litigation, Part IV

BY PETER SCHULMAN, CPA

Editor's Note: This is the final article in a series on the use of graphics in litigation services engagements.

GRAPHIC CONCEPTS— TYPES OF GRAPHS

In Parts I, II, and III of this series, we looked at several different types of graphs from actual cases. Now we will explore *when* to use a bar, line, area, or pie chart. You may find it helpful to look back at the graphs in our case studies (see Parts I, II, and III in the April, May, and June issues of *CPA/LSC*).

In review, bar charts are frequently used to illustrate comparative income statements. Bar charts:

- Show individual figures at specific times
- Give meaning to discreet points of data
- Illustrate comparisons
- Depict change between items

Line charts are frequently used to illustrate income streams and balance sheet ratios. Line charts:

- Show trends or changes in data over a period of time at even intervals (sometimes called time–series analysis)
- Emphasize time flow and rate of change, rather than the amount of change

Area charts are:

- Similar to line charts in that they show the relative importance of values over a period of time
- Similar to bar charts in that they emphasize the amount of change (magnitude of values) rather than time and the rate of change

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Pie charts:

- Show the relationship or proportions of parts to a whole at a given point in time
- Are most useful for emphasizing a significant element, particularly with "exploded" pie slices

We also distinguished between analysis and trial graphs.

- Analysis graphs are for understanding the data, exploration, and tabulation.
- Trial graphs are for communicating concepts elegantly and intuitively.

GRAPH DESIGN

Avoid the "lie factor[1]." The lie factor occurs when the representation of numbers, as physically measured on the surface of the graph itself, are not in proportion to the data being represented. In other words, the lie factor occurs when the graph is not an accurate representation of the data. A lie factor greater than 5% is considered substantial.

Graphs drawn by computer programs and based on the data should be a precise representation of the data, barring programming bugs, of course. When graphs are prepared by hand or using a drawing program, the axes and data series should be checked carefully to make sure that they are accurate. You should also ask the attorneys you work with to ask the opposing expert in deposition what program, if any, was used or will be used to prepare graphs. Graphs prepared by the opposition should be checked carefully for accuracy. If they violate the lie factor by more than 5%, the attorney you're working for may want to make a motion to have them excluded.

Sometimes I use an artist to prepare trial graphs, particularly for overlays and high-end graphs such as the flashlight graphs I discussed in the Flashlight USA case earlier in this series. When selecting an artist to do trial graphs, find someone who is interested in the concepts underlying the graphs.

Using an artist who will embrace the concepts underlying the graphs has several advantages. First, if the artist understands the subject matter of the graph or graphs, he or she can fully participate in the creative process. Second, the likelihood of falling into the lie factor trap will be reduced because an artist who has a respect for data and an understanding of the case is less likely to make a mistake. Third, the expert can use the artist as a sounding board and rehearsal for presentation of the graphs and the underlying concepts. Think about this, if you can't explain the concepts underlying your graphs to an artist, how can you expect a jury to understand you?

Don't overuse graphs. A few good graphs are more effective than several poorly designed graphs. If you think you need many graphs to communicate your message, consider a single graph as base-art with overlays, as we discussed earlier in this series. Overlays are often easier to understand than data presented on several graphs. The horizontal and vertical axes on the base-art serves as a common frame of reference, making comparisons between data series intuitive. Overlays can also be used to distinguish the "hard" data from expert estimates and opinions.

When designing graphs, keep the following concepts in mind[1]:

1. Distinguish the "hard" data from expert estimates.
2. Emphasize substance rather than methodology, graphic design, the technology of graph preparation, or other extraneous subjects. A good example of what not to do can be found in a bar graph I once saw that used Victorian buildings stacked on top of each other in place of the bars. All I noticed were the buildings; the substance was lost.
3. Make large data series coherent and, to the extent possible, intuitive. In other words, with a brief explanation, the message should be apparent to the viewer. The pie charts in Figure 15 (see May 1995, *CPA/LSC*) are a good example of this.
4. Encourage the eye to compare different data series. One example is Figure #19 (see June 1995, *CPA/LSC*), in which we compared two separate data series—historic sales and actual customer counts.
5. Integrate data with graph annotations and verbal descriptions. For a good example of this, see Figure #16 (June 1995, *CPA/LSC*).
6. Make labeling, annotations, and legends clear and thorough.
7. Keep in mind a clear purpose. Is your graph for analysis or trial?

Avoid "chartjunk[1]." Chartjunk is non-data-ink or redundant data-ink, in other words, ink that does not tell the viewer anything new. Chartjunk is often decorative, used to make the graphic appear more scientific and precise, to enliven the display, to make the graph visually more appealing, or to give the designer an opportunity to exercise artistic skill. Chartjunk includes cross–hatching (see Figure 7, April 1995, *CPA/LSC*) and gridlines. Chartjunk clutters up the graphic, carries no information and generates

[1] *The Visual Display of Quantitative Information*, Twelfth printing, March 1992, Edward R. Tufte

graphic activity that is unrelated to data information.

In summary, keep in mind that graphical excellence requires[1]:

1. A well–designed presentation
2. Emphasis on substance
3. That complex ideas be communicated with clarity, precision, and efficiency
4. That the greatest number of ideas be communicated in the shortest time, with the least ink, in the smallest space

PRESENTATION OF TEXTUAL MATERIALS (NUMBERS AND WORDS)

The case and typeface you choose make a difference in the visual impact and readability of any presentation.

- "Case" (lowercase, UPPERCASE, etc.)—Many studies have shown that text presented in title-case or sentence-case is easier to read than text presented in all capital letters. Retention is also higher. In title-case the first letter of each word is capitalized and the remainder of the letters are lower case. In sentence case the first letter of each sentence or line is capitalized and the remaining words are lowercase.

  Also, NOTICE HOW UNATTRACTIVE ALL-CAPS ARE AND HOW MUCH MORE SPACE IS USED BY TEXT PREPARED IN ALL-CAPS.

- Typefaces—Proportional-spaced typefaces, in which each character is allotted a different amount of space, are available in a wide variety of styles and are usually easier to read than `typewriter style`. For example, in the combination "iE," the "i" takes up less space than the "E" in proportional-spaced typefaces; whereas `each character takes up the same amount of space in typewriter style (i.e. Courier). For example, in "iE,"the "i" takes up the same space as the "E."`

  Some common proportional-spaced typefaces are: Times New Roman, Garamond, and Futura. Some less common are: Zapf Humnst, Arial, and Coronet. There are hundreds more to choose from.

- Underscores—Use real lines for underscores rather than dashes.

- Enhance the graph's appeal by using shading, drop-shadows (notice the shadow behind the title bar in Figure 1, April 1995, *CPA/LSC*), and borders where appropriate.

I have noticed a tendency for some accountants, including litigation consultants, to trivialize the importance of visual enhancements such as the ones listed above. They say things like "It doesn't need to be pretty." "The numbers are right." "We can't get paid to make it pretty." Let's step outside our profession for a moment. When we go into restaurants we expect our food to be presented in an appealing manner. When we fail to think about the cosmetic aspects of our presentations, we're a little like the restaurateur that slops our food on the plate and says something like, "Eat it. It may not look pretty, but it tastes good."

The point is, we are not just in the analysis business; we are in the communication business, and the visual aspect of our work (how we present our ideas) is as important as the quantitative substance of our work.

Furthermore, today's graphic interfaces (for example, Windows and WYSIWYG, which stands for "what you see is what you get") frequently make it possible for us to present our work in an elegant and appealing manner with little or no additional time spent on the process.

COMPUTER TECHNOLOGY

Our industry is technology driven. We use computers, computer programs, and computer peripherals (printers, modems, scanners, etc.) everyday in our professional lives. Even though today's technology is one of our greatest productive and creative resources, particularly in the litigation consulting business, CPAs frequently misuse, underutilize, and mismanage technology. Computer technology is also a source of contention in many CPA firms.

TECHNOLOGY PLAN

Computer decisions, particularly regarding software selection, are more than asset purchases. They are long-term, strategic decisions, primarily because of the potential business implications (competition, marketing, etc.) and training costs or, alternatively, the opportunity costs of later sticking with a bad decision if we aren't willing to change to a preferred application.

In spite of the dramatic effects technology decisions have on practices, CPAs frequently make technology decisions haphazardly. Furthermore, in CPA practices it is often the people with the least hands-on-experience in using technology who often express the strongest opinions. I find that ironic because we frequently stress *our* experience and training when marketing services to new clients, or when marketing new services to existing clients.

CPA firms need a technology plan, a set of goals and standards to serve as a basis for acquiring hardware and software and for making other decisions that will meet the

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firm's short-, medium-, and long-term objectives. Following are my specific recommendations.

GOALS—WHAT DO WE WANT OUT OF TECHNOLOGY?

1. At a minimum we should keep pace with our competition. Ideally, we should try to stay ahead of our competition.
2. Computer resources (hardware, software, technical support, consultants, internal staff, etc.) should serve as productivity tools for our professional and administrative staff.
3. Computer software decisions should provide a migration path to future technologies, as they emerge.
4. Computer hardware and software decisions should minimize training costs. In this context, I am not just referring to seminar costs. Training costs include the time each individual spends privately or with co-workers, whether during normal working hours or at other times.
5. Computer software decisions should use internal resources (staff, library, phones, etc.) and external resources (tech. support, consultants, etc.) efficiently and, when possible, synergistically.
6. Computer hardware and software decisions should minimize risk. We have all heard of "computer disasters," and many of us have experienced them in varying degrees. Mistakes regarding hardware and software can be financially and emotionally expensive.
7. The acquisition of computer hardware and software should be made cost effectively and in a timely manner.

STANDARDS AND RECOMMENDATIONS—

1. *Use mainstream technology*, particularly in selecting software. That is, use a program or group of programs that has gained a dominant market position. This concept is consistently overlooked by the technical and business press, but I think it is *the most important long-term issue in making good technology decisions*. If you decide not to use a mainstream program, you run the risk that the software publisher will be unable to keep up with the competition and may not be there to offer support in the long-run.
2. *Switch from DOS to Windows*. As we observed in our Flashlight USA case study when we compared the bar charts prepared by a *DOS* program to the bar charts prepared by a *Windows* program, graphics prepared in *Windows* tend to be more readable and visually appealing. In general, *Windows* programs are significantly more user-friendly and have greater capabilities than comparable *DOS* applications.
3. *Choose software based on its ability to meet your needs*. Historically this has sometimes meant a features and benefits analysis of all the contending products. Experience has shown however that this methodology does not always lead to real success. I believe that if you could choose software on the basis of a single criterion, that criterion should be the market—looking at both dominance and trends.
4. *Take advantage of the benefits offered by software "suites,"* sets of applications (primarily word processing, spreadsheets, database, graphics, and presentations) that are designed to work together. This is sometimes referred to as interoperability or software integration.

   I use and recommend the *Microsoft* suite, which includes *Excel. All the graphs in this series were produced using the graphics capabilities of Excel.* I use *Excel* because (1) *Excel's* spreadsheets, graph, and database capabilities (collectively) are superior to its competition, and (2) *Microsoft* has consistently provided stable and state-of-the-art upgrades to its users.
5. *Standardize the applications used by personnel to minimize training costs.* For example, if part of the staff is using *Lotus* and another part is using *Excel*, firm personnel resources become fragmented.
6. *Make a commitment to training*. This has several benefits including the effective use of technology and the professional development of your staff. Technology and training also contribute to staff morale by letting the staff know that you support them. And staff can take pride if they feel that they are a part of a cutting-edge organization.
7. *Buy as much hardware as you are able to afford*. In the long run you will save money because the hardware you purchase will last longer before it becomes obsolete. The minimum configuration for *Windows* users today is a 486/66 with a 500 megabyte hard drive and 16 megabytes of RAM.

If you adopt the above goals and standards and stick to them, you should discover that most of your technology decisions will come quite easily because there are really very few alternatives that will meet all of the objectives and standards you have set.❖