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By Rodger L. Brannan and Bruce Busta

Recently there has been a great deal of concern about the quality of auditing within the accounting profession. The American Institute of Certified Public Accountants (AICPA) has issued the *Anderson Report* (1986) and the *Report of the Task Force on the Quality of Audits of Governmental Units* (1987), both illustrating the need for high quality audits. In addition to increased litigation facing the auditing profession, reports by the Dingell Committee (House Report, 1987) and Treadway Commission (1987) point out some of the problems. A recent General Accounting Office (GAO) study (GAO Reports, 1986) found that approximately 30 percent of the single audit reports examined were seriously deficient. These deficiencies included reports which were based on non-existent workpapers and conclusions where were not supported by the evidence in the workpapers; the litany of "horror stories" stemming from this study is lengthy. Even more disturbing is the fact that the GAO felt comfortable in extrapolating the survey's results to the general population of auditing firms.

These results indicate the profession has cause to worry and valid reasons to consider a radical change in thought. This paper presents a new way to view the audit process: zero defect auditing. The zero defect auditing concept places its emphasis on quality control implemented in a cost-effective manner. Just as the zero defect concept has been economically justified in the manufacturing setting, zero defect auditing also can be shown to be economically viable.

The first section of this paper examines the philosophy and cost justification of a zero defect policy in the Japanese manufacturing setting, the first application of the zero defect concept. Paralleling the manufacturing setting, the philosophy and cost justification of the zero defect concept are explored in the auditing setting. Finally, the impact of a zero defect policy on audit risk is discussed and conclusions are drawn.

Zero Defect Manufacturing

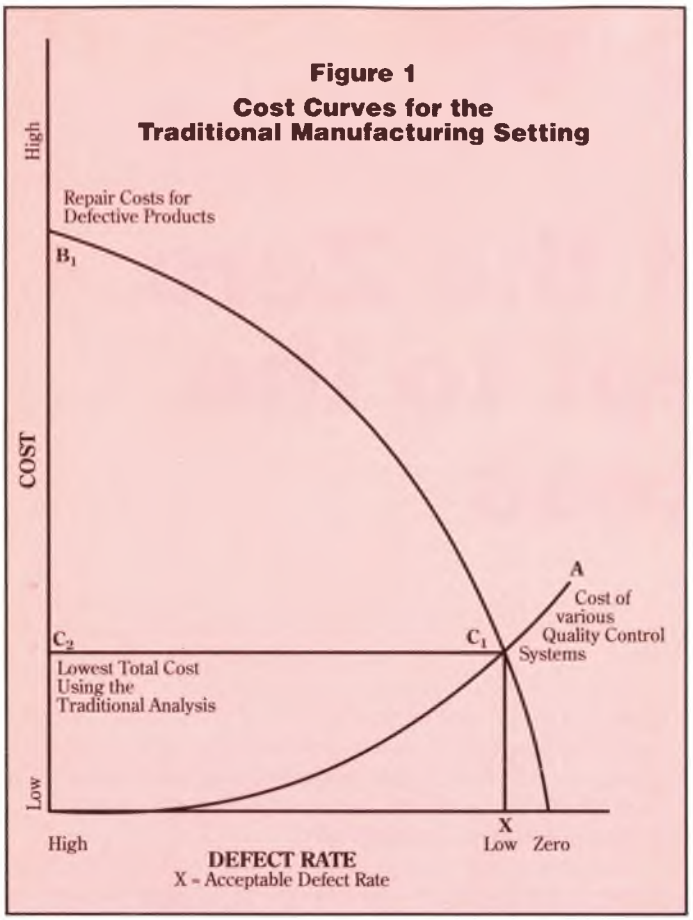
In the 1950's, Japanese products had a reputation of being cheap and shoddy. Japanese business and political leaders projected they could be successful in the world market by using superior quality as a competitive edge. Believing that a quality, or zero defect, manufacturing process would lead to high quality products, the Japanese embraced the zero defect manufacturing philosophy.

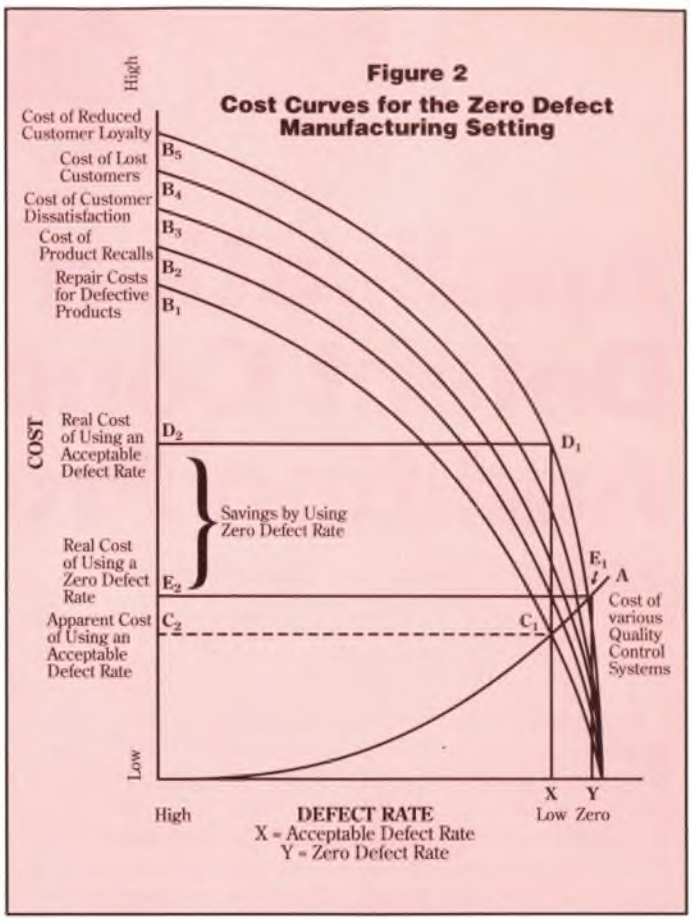
The zero defect concept starts by drawing a distinction between the *manufacturing process* and the *manufactured product.* By viewing the manufacturing setting as having two distinct elements, a process and a product, emphasis can be placed on the process which is the source of the product and the cause of any product defects.

The concept has three critical stages: planning, production, and review. In the planning stage, reliability must be designed into both the manufacturing process and the product. The production stage emphasizes minimization of errors and defects in the manufacturing process and the finished product. The third step is an inspection stage which identifies defective products and the cause of the error. During this step, both the error and its cause are corrected. This stage represents the last clear chance to detect and correct any systematic or random errors in the production process and the product.

In order to eliminate all manufacturing process defects and, accordingly, all product defects, quality is designed and planned into the product by assuring the highest manufacturing standards at every stage of production. There is no tradeoff between cost and quality.

Japanese quality control circles uncompromisingly review every aspect of the process and product. When errors are found, production is halted until the source of the problem can be identified and corrected. Corrective action focuses on the system and the cause of the error, not on correcting the specific error in the product. Thus, correction requires two steps; the defective product must be repaired, and the production process must be corrected, eliminating potential future problems. The goal among Japanese manufacturers is to eliminate all possible production defects and, consequently, all product defects.





Economic Justification of Zero Defect Manufacturing

In order to justify this "quality at any cost" philosophy, the Japanese use long-run and intangible costs in their analysis. Traditionally, the cost-quality tradeoff has been measured as shown in Figure 1. Curve A illustrates the costs and defect rates of various levels of quality control systems. Curve B1 Represents repair costs when defective products are replaced.

The traditional cost analysis (the one historically adopted by U.S. manufacturers) allows an "acceptable defect rate" (point X in Figure 1). The acceptable defect rate is determined from the intersection of the two cost curves (point C1) and represents the lowest total cost (shown by point C2 on the vertical axis).

By incorporating long-run and intangible costs into their cost analysis, the Japanese see the cost-quality tradeoff as shown in Figure 2. Curve A again depicts the costs and defect rates of various quality control systems, with the far-right side of the graph indicating a zero defect system. Curve B1 shows the repair costs when defective products are replaced, and the long-run and intangible costs of product recalls, customer dissatisfaction, lost customers, and reduced customer loyalty are illustrated by curves B2, B3, Br, and B5, respectively. This "comprehensive" cost analysis serves to justify a zero defect approach in the manufacturing setting.

In this complete analysis, the cost of an acceptable defect rate system is represented by point D2. The cost of a zero defect system is point E2. Point C2 is an illusionary cost; it represents the optimal point when long-run and intangible costs are not included in the analysis. Figure 2 demonstrates that, by shifting the defect rate from point X to point Y, a zero defect manufacturing process is cheaper than an acceptable defect rate production process. This analysis gives the Japanese a cost-quality perspective that economically justifies a zero defect manufacturing policy.

Zero Defect Auditing

The auditing profession is being criticized severely for what the public perceives as "low" quality audit work. To effectively address these criticisms, the profession could adopt the zero defect concept from the manufacturing realm to produce audit work of maximum quality. These high quality audits would represent an effective response to the severe criticism the profession is under, close the expectation gap, and address the challenges presented by the Dingell Committee and Treadway Commission.

In an auditing environment, as in manufacturing, there are two parallel elements. One involves the *process* of the audit work; the other is the resulting *product,* the audit report. As in the manufacturing setting, the product is the result of the process. Thus, the zero defect auditing philosophy stresses the procedures and processes used during the performance of the audit work.

A zero defect audit approach should parallel the three critical stages of the Japanese zero defect system: planning, performance, and review. In the audit planning stage, the overarching concern is on planning quality into the audit work before the staff begins its fieldwork.

During the performance of the zero defect audit, field work is thorough and comprehensive. The "messy"

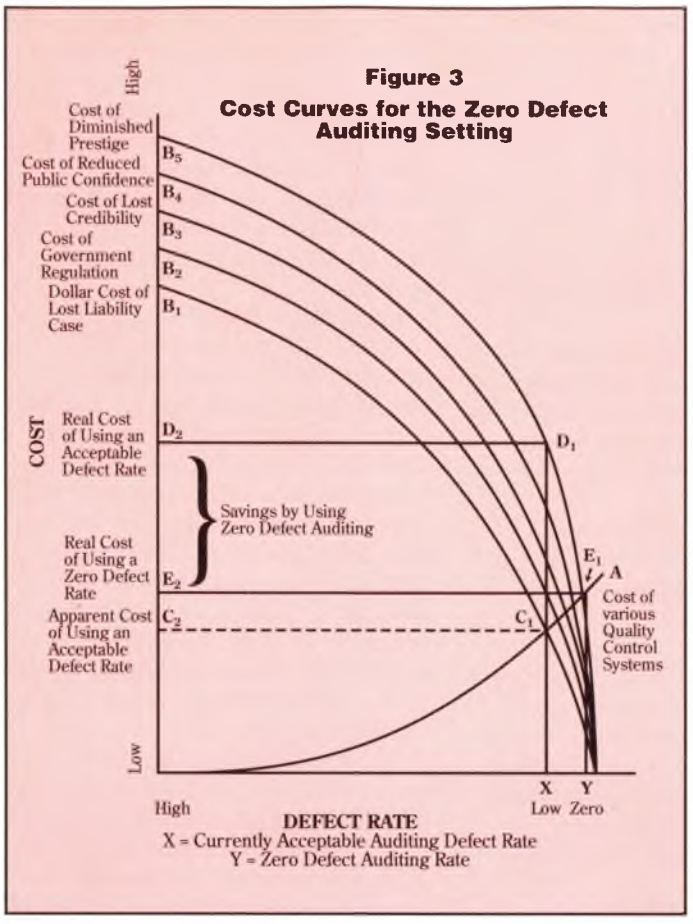


Figure 3
Cost Curves for the Zero Defect Auditing Setting

areas of an engagement are *fully analyzed,* not "generally understood." Questions that can open a Pandora's box should be asked, not avoided. Documentation must be complete in *every* respect. *All* parts of *every* workpaper should be completed fully. Shortcut phrases such as "pass as immaterial" and "same as last year" would be appropriate only in very rare situations. Zero defect auditing requires complete compliance with every auditing policy and procedure that a firm has established for the specific type of audit being undertaken.

The audit review process is the oversight and control point of a zero defect auditing policy. It makes certain that a zero defect concept begins in the planning stage and is pervasive during the implementation of the audit. As the central point of a systems approach to an error-free audit, it provides the last opportunity to uncover errors in the audit. Using the same mind-set as the Japanese use in their production processes, the reviewers meticulously inspect the pre-audit planning schedules, fieldwork, and financial statements for errors and omissions. If any are discovered, the audit is halted and a complete investigation is undertaken to determine the cause of the error or omission. Corrective action requires a fundamental change in the audit process to ensure this type of failure will not recur. This is not a "band-aid" approach where the specific error is corrected; rather, the auditing process is changed so the specific error is corrected and future errors of this type are prevented. When corrective action is taken, the audit and the review process can proceed.

A zero defect audit complies with every policy and procedure established by the firm and profession. In essence, the highest quality audit possible is performed when implementing a zero defect policy.

Economic Justification of Zero Defect Auditing

This policy may have the appearance of being excessively expensive. However, the costs to the profession, and eventually every CPA firm and practitioner, of not employing a zero defect auditing policy are even greater. By incorporating the long-run and intangible costs into the cost-quality analysis (as the Japanese have done in manufacturing) it can be shown this is a sound strategy for the long term. The success of the Japanese approach to manufacturing has demonstrated the viability of including the long-run and intangible costs in the analysis.

It is difficult to measure the long-run costs that make a zero defect auditing policy superior to one that allows anything less than perfection. Figure 3 estimates the long-run costs and illustrates why the accounting profession should adopt a zero defect auditing approach. Curve A represents the cost of various quality control systems, with the far right depicting a quality control system that allows zero defects. Curve B1 represents the traditionally computed costs of audit failure, such as the dollar amount of a successful lawsuit against the auditor. (Other traditional costs include the expense of liability insurance and a successful defense of a lawsuit against the auditor.) This traditional analysis does not incorporate all the costs of permitting audit errors; in particular, it does not include the long-run and intangible costs. It therefore results in the suboptimal decision rule that the defect rate should be set at point X. As Figure 3 shows, by incorporating only the tangible costs in the cost-quality trade-off, point X results in an apparent cost of C2. The total lost is revealed by D2, which includes the long-run and intangible costs.

This expanded analysis includes the cost curves that are currently facing the auditing profession: imposition of government regulation (B2), lost credibility of the profession (B3), reduced public confidence (B4), and diminished prestige in the business community (B5). The inclusion of these costs shifts the optimal point to Y and makes a zero defect auditing policy economically sound. These long-run and indeterminate costs are difficult to measure, but they are real!

Because of the difficulty in quantifying these costs, there is a tendency to underestimate the long-run effects of allowing an "acceptable" number of defects and the benefits of having zero defects. Since the short-run costs of more staff and review time are relatively easy to measure, the short-run costs overshadow the long-run costs. This bias to the short run could lead the auditing profession to make misguided decisions by selecting a defect rate that does not result in the lowest total cost.

Limitations of Zero Defect Auditing

This paper imports the zero defect concept from the manufacturing setting and applies it to the auditing setting. Because these two settings are not completely analogous, certain qualifying points must be explained.

In the manufacturing setting, generally less judgment is exercised by the worker than in the auditing

setting. For example, the torque required on a bolt can be specified by an engineer and readily measured; the assembly of a product often must be made in a specific sequence. In the auditing setting, usually such quantifications and specifications are not available. There are no quantified specifications regarding the completeness of a bank reconciliation or the depth in which an auditor should observe inventory. The auditor can not rely on quantified guidance in determining how extensively an issue should be probed.

Despite this difference in human judgment, the fundamental goal and mind set of the workers are the same. In both settings, the individuals are doing whatever is necessary to ensure their task is completed at the highest standard possible. For the auditors, their goal and mind set should be directed so they can be certain there are no errors, and they have done everything possible to ascertain the necessary facts.

Another difference concerns the repair of a defective process. In the manufacturing setting, a defective process requires a change in machinery or operator. In the auditing setting, a repair of defective audit work generally comes in the form of additional training for the auditor or replacement of the auditor. Such training (continuing professional education) should be targeted at correcting the specific errors that arise in the audit process. Since zero defect auditing requires correction of the process which caused the error, this compels the auditor to completely understand the source and repercussions of the error. A view of the entire system is needed to ensure the identified failure has been fully corrected.

Zero Defect Auditing's Impact on Audit Risk

Zero defect auditing lowers audit risk on two levels. On an individual level, it lowers risk in each specific audit in which it is used. On a broader level, it lowers the total risk faced by the profession.

Every audit that an auditor undertakes has a certain level of risk. Audit risk is the product of three individual categories of risk, as diagrammed in Figure 4.

Inherent risk is the uncertainty that exists because of the vulnerability of an account to error or mismanagement. The control risk is the reliability of the control structure. Detection risk is the possibility that the auditing procedures will not detect flaws in the financial statements.

Zero defect auditing impacts the detection risk element of the model. Detection risk, in this paper, is broken down into controllable and uncontrollable risk. Uncontrollable detection risk (also referred to as sampling risk[1]) results from financial statement errors that go undetected when a perfect audit has been performed. This risk is the result of using audit sampling rather than a process that reviews every transaction that has occurred. Uncontrollable detection risk is a function of the confidence levels set by the auditor. A 99 percent confidence level virtually eliminates uncontrollable detection risk, however, but it cannot be eliminated completely unless confidence levels equal 100 percent.

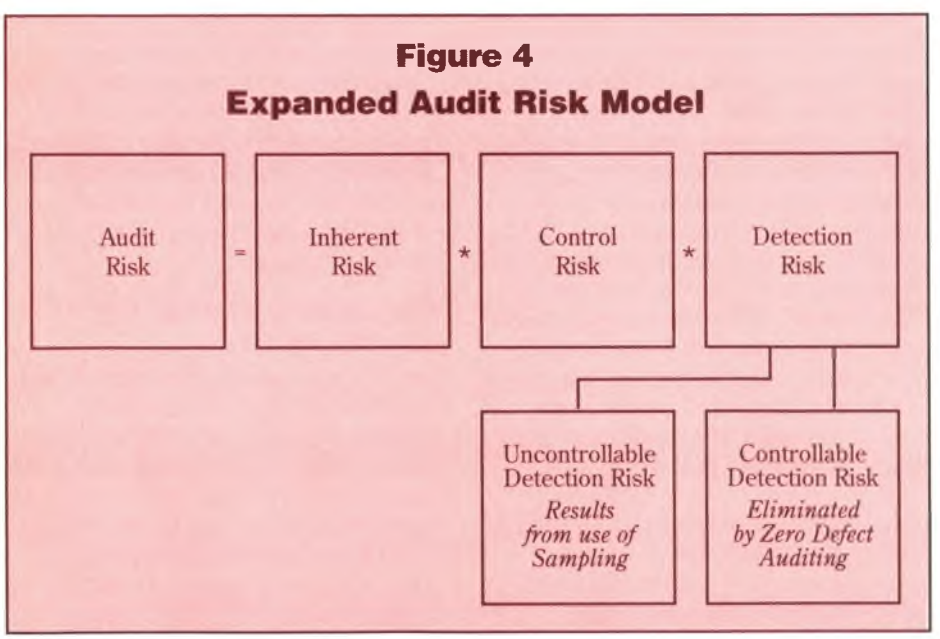
Controllable detection risk (also referred to as non-sampling risk) accounts for the other portion of overall detection risk and is a function of the quality of the planning, fieldwork, and review stages of an audit. This portion of the risk, by definition, can be eliminated completely with a zero defect auditing policy. An audit that is free of defects in terms of planning, fieldwork, documentation, preparation of financial statements, and review will detect all flaws that can be discovered with the use of auditing techniques.

Because detection risk has these two components, zero defect auditing is not 100 percent assurance. A zero defect policy will eliminate all controllable detection risk, but cannot eliminate uncontrollable detection risk. Consequently, in perfect or zero defect audit, errors will remain undiscovered only because of the use of sampling. Errors as a result of omitted policies and procedures will not exist.

A zero defect auditing policy therefore lowers audit risk in an individual audit by lowering controllable detection risk, which in turn lowers the overall detection risk.

An interesting observation can be made now that a distinction has been drawn between uncontrollable and controllable detection risk. Most auditors would not consider lowering confidence levels (increasing uncontrollable risk and total detection risk) because of staff or budgeting constraints. However, if the omission of an auditing procedure or if deficient fieldwork is occasionally tolerated because of staff or budgeting con-

Figure 4
Expanded Audit Risk Model



[1]The term "uncontrollable" is used because statistical samples are always subject to error, since they do not observe the entire population. Sampling introduces an uncontrollable element in the audit process that is not found in the manufacturing setting. Because sampling is fundamental to the auditing process and the examination of the population is economically unjustified, this type of error is considered "uncontrollable."

straints, this omission of deficiency increases controllable detection risk and, consequently, total detection risk. In other words, a shortcut in the audit (increase in controllable risk) has the same effect as lowering confidence levels (increase in uncontrollable risk), an action most auditors would not consider. In fact, a serious flaw in the audit is the same as dropping the confidence levels to dangerously low thresholds.

The profession as a whole faces a fixed level of risk. Unlike individual auditors who can accept or reject an audit engagement, the profession cannot shift its total audit risk. Because the law requires that certain entities must have their financial statements audited by certified public accountants, someone in the profession must accept that risk. Thus, from the profession's perspective, risk cannot be passed on to someone else. Consequently, the profession must look for ways to reduce the total existing audit risk.

The total audit risk that the profession faces is made up of the risk faced in each individual audit. Therefore, if the risk in each individual audit is reduced, the total audit risk faced by the profession is reduced. A zero defect auditing policy reduces the risk faced in each individual audit where it is applied. This has the impact of effectively lowering the total audit risk faced by the entire profession.

Conclusions

The auditing profession has been under severe criticism because of the public perception of substandard audits. This paper advocates a zero defect auditing policy which mandates the highest form of quality control. On the surface, zero defect auditing appears to be an "over-auditing" policy, unless one incorporates the long-term costs facing the profession. By factoring in the costs of government regulation, lost credibility, reduced public confidence, and diminished prestige, zero defect auditing is cost justified. The costs of this policy are high, but the primary benefits (self-regulation, increased credibility, public confidence, and prestige) are greater.

A zero defect auditing policy is a systems approach which concentrates on ensuring quality in the audit process. This in turn results in s high quality audit product, the audit report. A zero defect policy can be adopted on an individual basis or by the profession as a whole. In whatever way it si adopted, it lowers the audit risk in each individual audit and, consequently, the total risk imposed on the profession.

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A Note from the Editor

I wish to thank those Board members who gave me the opportunity to serve as the Editor of *The Woman CPA*. Special thanks should also be extended to Jan Colbert for her tireless efforts as Associate Editor, Elise Jancura and Roland Madison for many years of service as Department Editors and also to our new Department Editors, Ann Pushkin, Mary Alice Seville, Chris Fugate, Lisa Martin and Teresa Thamer. Our reviewers have donated many hours to reading and evaluating manuscripts and deserve our heartfelt gratitude.

Each issue of the journal would not have been possible without the timely efforts of our typesetter, Wendi Williams of D&M Graphics in Louisville, KY, and our printing representative, Tom Ladd of Democrat Printing in Little Rock, Arkansas. Other people who devoted many hours to our publication are Lynette Sarther, our business manager and Jo Anne Dooley, our Treasurer.

It took the time, talents and efforts of all of these people to produce each quarterly issue.

I have learned so much during the past two years as Editor and preceding one year as Associate Editor. Thank you, the members.

Betty Brown