

OPTIMISED RISK MONITORING WITH ACCEPTANCE SAMPLING



By Peter Mills, 17th March 2014

Introduction

Monitoring risk control effectiveness is an important but often poorly executed part of the risk management process. History shows us that major risk events are often caused by companies that believed they had effective risk controls in place, only to find this wasn't the case. In this article I will be outlining how proven acceptance sampling methods can be used to significantly improve an organisation's risk monitoring capability, while at the same time reducing auditing costs.

The Problem

Many organisations often fail to identify ineffective risk controls because they do not have the resources or expertise needed to undertake continuous statistical process control (SPC). Instead, they rely on less-costly and unreliable solutions like management reviews, employee meetings, KPIs, auditing, etc.

Auditing can be a very effective method of monitoring risk control effectiveness, however most auditing systems lack any scientific logic behind the selection of the sample-size and the analysis of results. This means the reliability of the audit result remains unknown, which makes it very difficult to consistently compare risk control performance within and across different business systems.

Acceptance Sampling

Acceptance Sampling is a proven scientific method of monitoring and controlling noncompliance. There are many types of Acceptance Sampling but the most popular and user-friendly is the Acceptance Sampling by Attributes methodology published by the International Organisation of Standardisation, ISO2859.1, Sampling procedures for inspection by attributes. Equivalent versions of this Standard are published by other Standards bodies worldwide; e.g. ANSI/ASQ Z1.4, BS6001:1, DIN40080, AS1199.1, NF06-022, DIN 40080, etc.

The Standard’s most valuable feature is the ability to accurately assess whether a user-specified noncompliance limit has been exceeded; or not. This limit is referred to as the Acceptance Quality Limit or Level (AQL); depending on which Standard you read.

Although initially developed as a quality control tool the statistical methods that underpin the procedures and tables in the Standard are equally suited to other risk monitoring and control applications; e.g. safety, financial, environment, fraud, security, project, asset, IT, etc.

The Standard also includes a useful risk-based productivity feature that “switches” audit sample-sizes up and down depending on previous results. This smart approach to auditing can deliver audit savings up to 65% for processes that perform consistently better than the specified AQL.

In Practice

Let’s look at an example of how the procedures in the Standard can be used to optimise risk monitoring for a safety management system. Let us assume the risk assessment process has already been completed and a series of safety controls identified to reduce risk levels within acceptable limits.

The next step is to allocate each control a risk category based on its impact on total safety. This process is best illustrated using the 4 x4 matrix similar to what might be used to assess individual safety risks; refer to Figure 1. In this case the vertical axis represents the consequences of a single control failure and the horizontal axis the control’s expected failure rate or frequency.

Each risk control category is then assigned a maximum failure rate, or AQL. As illustrated, risk control categories with the highest impact on safety are assigned a small AQL, while those with a lower impact a higher AQL.

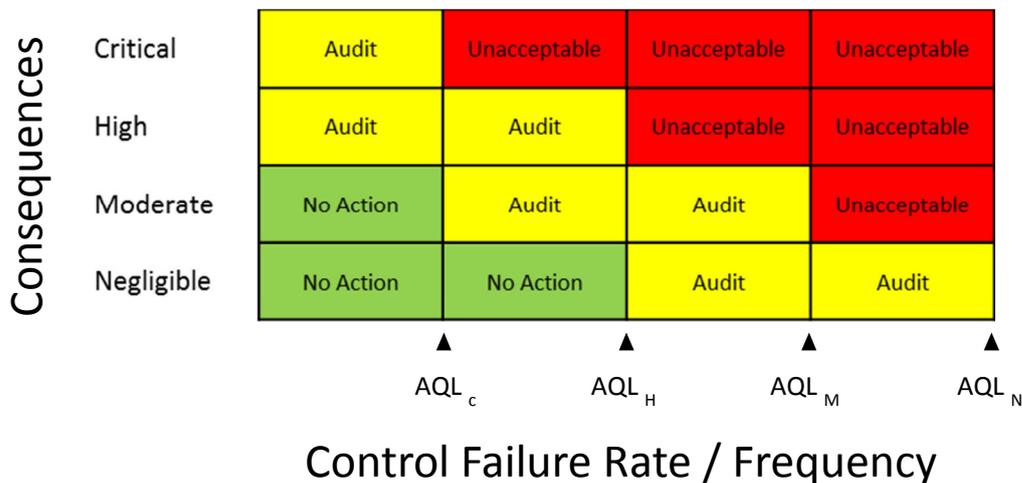


Figure 1: Risk Control Matrix

As indicated, the above risk control matrix can also be used to identify which risk controls should be regularly audited (marked Yellow) and those that might be more efficiently monitored through less expensive methods (marked Green); i.e. management reviews, risk workshops, etc.

Having categorised our risk controls, the procedures and tables in the Standard are used to determine the Sample-Size (n) and Acceptance Number (Ac) for each audit; refer to Figure 2. The Acceptance Number (Ac) represents the total number of control failures allowed in the sample before the audit universe (N) is deemed to have exceeded the specified AQL.

At the completion of each audit the total number of control failures for each risk category is compared with the respective Ac to obtain an Audit Result; i.e. Pass or Fail. The typical response to an audit “failure” will include a root-cause-investigation and the strengthening of identified ineffective risk controls.

Audit Plan			Audit Outcomes	
Audit Universe (N) = 5,000 Sample Size (n) = 200				
Control Risk Category	Max Failure Limit (AQL)	Acceptance No. (Ac)	Total Control Failures	Audit Result
Critical	AQL _C = 0.01%	0	0	Pass
High	AQL _H = 0.40 %	1	1	Pass
Moderate	AQL _M = 1.50 %	3	4	Fail

Figure 2: Example Acceptance Sampling Audit Plan and Outcomes

Applying the Standard’s “switching” feature will result in risk control categories that repeatedly meet or come in lower, than their respective AQL being rewarded with lower audit sample-sizes over subsequent audits, whereas risk control categories that consistently exceed their AQL will be subject to higher levels of rigor; i.e. smaller Ac’s and/or larger sample-sizes (n).

Advantages

As outlined, acceptance sampling has many benefits over traditional non-scientific risk auditing methods, including;

- (i) It removes the guesswork surrounding what to audit, how much to audit, and when action is needed to strengthen risk controls,
- (ii) It focuses an organisation’s limited auditing and improvement resources on those areas that will generate maximum value,
- (iii) It significantly improves an organisations ability to identify and correct ineffective risk controls before they have a chance to impact on its goals and objectives,
- (iv) It facilitates continuous improvement; e.g. rewarding producers for superior compliance performance and penalising them for unacceptable performance.

Disadvantages

Acceptance sampling is not without its weaknesses, which include;

- (i) The audit result is always an estimate. As with any auditing system there is always a risk the result is incorrect. A benefit of using the acceptance sampling methodology outlined in the Standard is that this “audit” risk is known; it can also be adjusted up or down to strike a desired balance with an organisation’s auditing costs.
- (ii) The methods in the Standard can be difficult to understand. This is especially true for employees that don’t have a background in statistics. Fortunately, detailed instructions on how to apply these methods are also published by most Standards bodies.
- (iii) The cost of designing and operating a suitable system can be expensive. This is becoming less of a problem with an increasing number of software solutions now available.

Conclusion

In today's complex business environment ineffective risk controls can often be hidden from organisations until it is too late. One of the main reasons ineffective risk controls often "fly under the radar" is that traditional non-scientific auditing solutions aren't capable of providing organisations the reliable and timely information they need to avoid them.

Acceptance sampling solves this problem by providing organisations a highly reliable and defensible solution for the continuous monitoring and control of not just quality risks, but other risks too.

Once only the province of organisations that could afford to design and operate a suitable acceptance sampling system, recent advancements in technology and internet-based software solutions have made it possible for organisations of all types and sizes to take advantage of this best-practice methodology.

When compared to traditional non-scientific auditing methods acceptance sampling should lead to less auditing work, lower costs and reductions in organisational risk exposure.

For further information on this subject please visit www.compliance-master.com . Your comments and feedback are most welcome.



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