

• SINCE 1994

# Risk-based *testing*.

WHAT IT IS, WHY IT WORKS, AND A CA PILOT THAT PROVES IT .  
REX BLACK, INC.

You are going to test  
*less than 100%*  
of the system.

The question isn't *whether* you'll make a selection.  
It's whether the selection is **deliberate or accidental**.

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# In plain English.

For any real product, there is an **infinite cloud** of possible tests. You do not have forever. You run a finite number. Measured as a percentage of what you could test, your coverage is always zero.

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Risk-based testing is how you select which tests to run — and which to cut first when the schedule compresses. This talk answers four questions:

- **How do you pick the right tests** out of an infinite cloud?
- **How do you know when you've tested enough** to ship?
- **When the schedule slips, which tests should you drop first?**

WHAT RISK-BASED TESTING IS

Quality risk.

*Prioritized tests.*

Informed trade-offs.

## DEFINITION

# The method in one slide.

**Quality risk** is the possibility that the product fails to deliver one or more of its key quality attributes.

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## Risk-based testing:

- Uses an analysis of quality risks to **prioritize tests**.
- Uses that analysis to **allocate effort** per risk item.
- Involves **business and technical stakeholders** so what gets tested lines up with what quality means to the people who live with the product.
- Also manages **project risks** — events that endanger the project itself — alongside the

THE FOUR BENEFITS

Find, minimize,  
measure, *cut.*

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BENEFIT 1 OF 4

# Find the scary stuff *first*.

Running tests in risk order finds defects in **severity order**.

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The first bug you find is the bug that matters most. Every fix window you open gets used on the highest-impact defect in the system.

# Minimize residual risk *at release*.

Allocating effort by risk concentrates testing where the stakes are highest.

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The residual quality risk at the moment of release is **lower than any other allocation** you could have chosen with the same test budget.

# Know the residual risk *during execution.*

Measuring by risk tells you where you stand in real time.

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You can answer "**is this ready?**" with evidence instead of opinion. Release when the risk of delay balances the risk of dissatisfaction.

# Cut in *reverse risk order*.

When the schedule compresses, drop tests you worry about **least** — not tests you happen to have left on the pile.

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The same time back, at the **lowest possible increase** in residual risk.

A COMMON OBJECTION

"Doesn't this  
*increase test work?*"

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# No. *Decreased long-run effort.*

Risk-based testing drives more **efficient** testing overall.

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After the initial quality risk analysis, only periodic updates and traceability maintenance are required. Every subsequent release rides on the same analysis — refined, not rebuilt.

CASE STUDY

CA pilot.

*Six activities.*

92 risk items.

# Six activities.

1. **Train** the stakeholders.
2. Hold the **quality risk analysis session**.
3. **Analyze and refine** the results.
4. **Align testing** with the risks.
5. **Guide the project** by risk.
6. **Assess** the benefits.

# One day. Worked exercise.

Not lecture. **Presentation, discussion, and a worked exercise.**

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Covers: the principles; the categories of quality risks; how to analyze them; how to align testing with risk levels; how to document the analysis; how to monitor risks during execution; how to report risk-based results.

# Two sub-sessions.

## IDENTIFY

Three whiteboards for the main quality-risk categories. Sticky notes under the relevant one. Three hours. **Over 100 risk items** — plus 11 project risks and 3 other issues.

## RATE

Likelihood + impact per item. Duplicates identified and merged. **40% rated in-session**; test manager finalized the rest with participants afterward. Ended with **92 risk items** on the docket.

# The *RPN* histogram.

Risk Priority Number = Likelihood × Impact. 1 (most risky) to 25 (least risky) on a 5×5 scale.

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**Common problem: clumping.** Shows up when the team skews impact toward worst-case, or when the scale has poorly defined distinctions.

**Check:** plot the histogram. **Fix:** refine the scale, re-rate.

# The CA histogram.

LIKELIHOOD (REASONABLE)

1 · 5 · 9 · 25 · 39 · 26

Skewed toward high end. Actual: mature product, stable codebase, experienced dev. The distribution reflected reality. **No adjustment.**

IMPACT (CLUMPED — FIX)

1 · 10 · **52** · 32 · 8 · 2

Over half the items at rating 2. Flattened the RPNs. **Redraw the line between impact 2 and 3.** Re-rate. Plot again.

# Allocation of *test effort* by RPN.

## RPN 1–12 · EXTENSIVE

Large number of tests. Broad and deep. Combinations and variations. **Bulk of test attention.**

## RPN 13–16 · BROAD

Medium number of tests across many interesting conditions. Fewer combinations; still wide coverage.

## RPN 17–20 · CURSORY

Small number of tests sampling the most interesting conditions. Enough for obvious regressions.

## RPN 21–25 · OPPORTUNITY

Leverage other tests to run one or two of these — **only if** investment is small and opportunity presents itself. Otherwise *skip it.*

# Priority beats *expertise assignment*.

Previously: tests assigned by tester expertise. **Bottleneck every time a key person was out.**

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Under risk-based testing: priority by RPN. Bottlenecks went away. High-priority tests ran early. Low-priority tests ran later.

**Bug management also changed.** Severity augmented with risk prioritization. Fix-time focused on the high-risk defects.

# What the pilot *delivered*.

- **Intelligent effort allocation** within the constraints the project actually had.
- **Priority-order bug discovery** that optimized every fix-time window.
- **Flexible handling** of reductions in time or resources.
- **Optimized quality** within the constraints, not in spite of them.

TAKEAWAYS

Select *deliberately*.  
*Cut honestly*.

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# On the method.

- **Coverage is always zero.** The honest question is how you select.
- **Four benefits, not one.** Find severity-first. Minimize residual risk. Know real-time risk. Cut in reverse order.
- **Run analysis as a workshop.** Whiteboards, sticky notes, business + technical + test.

# On running it.

- **Plot the RPN histogram.** If it clumps, the scale is wrong — not the product.
- **Map risks to specs and tests.** Traceability cuts both ways.
- **Priority beats expertise assignment** — routes around every bottleneck.

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*Release when the risk of delay balances the risk of dissatisfaction.*

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# Thank you.

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