

(When) Should a Software Factory be Lights-off?

Benchmarking Code Review Agents on Bug Detection

PRIMARY

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From the abstract record: developers spend more time reviewing than writing, and human review lags AI code generation, which is what makes review agents and 'lights-off' software factories attractive. CRBugBench mines bugs from repository history and pairs each with the pull request that introduced it. 1,000 review tasks across 98 open-source GitHub repositories, plus 800 tasks from proprietary repositories at one large company. Best agent: claude-opus-5 with copilot-cli catches 71.9% of bugs within its top five comments, up from 47.7% for opus-4.6 over five months. Agents are weaker on complex changes and on bugs requiring reasoning beyond the local code, and noticeably worse on proprietary repositories where project context matters more. Scaling compute helps most through prompt design: exploration-nudging prompts improve performance by up to 5.8% at 10% higher cost. The authors close with adoption guidance: scale review effort to PR complexity, steer agents toward project priorities, provide repository knowledge, choose models by PR characteristics, monitor quality as models change.

Note on the metric: top-five is a recall-at-k over the agent's comments, not a single verdict. No per-repository or per-complexity table is claimed in this edition.