MCP SERVER | NO CODE | CLOUD HOSTED

Cable Bolt Design Engineer MCP

Automate your underground excavation support and stability calculations.

Cable Bolt Design Engineer MCP handles the heavy lifting for geotechnical support design. Your AI client uses these tools to determine bolt geometry, calculate total system capacity, and generate installation patterns. It also checks your final designs against safety factors to ensure rock mass stability in mining or tunneling environments.

A+ Quality Score 100/100

excavation | rock-stability | cable-bolts | geotechnical-engineering | mining-support

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vinkius.com/en/ai-agent-connect/cable-bolt-design-engineer

SCAN TO VIEW

The connectivity layer between AI and the world's software.

Vinkius sits between AI and every application. All communication passes through Vinkius Cloud via the Model Context Protocol (MCP) — with governance, observability, and security at every layer.

Your AI Connections Run Through Vinkius Cloud

The world's largest managed MCP catalog

Vinkius is the connectivity layer where AI connects to the software your business already runs. We handle the hosting, the security, the credentials, the uptime — you get agents that actually do things.

We operate the world's largest managed MCP catalog. Major SaaS platforms, CRMs, databases, and cloud providers — running, monitored, production-ready. This MCP server is hosted and maintained by the Vinkius Cloud for AI Agents.

> *The agent doesn't manage credentials, doesn't manage uptime, doesn't manage security. Vinkius does.*
>
> — Architecture principle

Four Pillars of the Vinkius Runtime

01 — Security by design

Credentials stay encrypted at rest via AES-256. The AI agent never touches raw keys — they're injected into a sandboxed V8 isolate at runtime. Actions are logged, and connections have an emergency kill switch.

02 — Built on MCP Fusion

This MCP server was built with **MCP Fusion**, the open-source framework (Apache 2.0) that powers the entire Vinkius catalog. Schema-as-firewall strips undeclared fields, compiled PII redaction runs at zero overhead, and cryptographic lockfiles produce git-diffable audit trails.

03 — Deterministic observability

Eight immutable metrics per endpoint: request volume, p95 latency, error rate, active connections, cost attribution. A live payload feed logs every tool call with mutation detection.

04 — Autonomous operations

Servers are deployed, monitored, and patched autonomously. New capabilities and security patches ship weekly. Zero-downtime deployments ensure continuous availability across all managed MCP servers.

AES-256	Ed25519	24h TTL	V8 Isolate
Encryption at rest	PKI vault signatures	Ephemeral session keys	Sandboxed execution

One Token. Instant Access.

Every MCP server on Vinkius is accessed through a **Connection Token**. Tokens are generated in the cloud dashboard and produce a unique MCP endpoint URL. Paste this URL into any MCP-compatible client — no SDK required.

A single token can serve **multiple AI clients simultaneously**, or you can issue separate tokens per client for granular access control. Each token tracks its own request count, last activity timestamp, and can be individually enabled or revoked.

MCP ENDPOINT

```
https://edge.vinkius.com/{token}/mcp
```

Claude · Cursor · VS Code · Windsurf · Grok · Gemini

Security Is the Architecture

Security in Vinkius is not a feature — it's the foundation of the runtime. The gateway enforces multiple independent protection layers between AI agents and third-party APIs.

01 — Ed25519 PKI Vault

Every workspace has an Ed25519 Master Key. Session keys are generated ephemerally (24h TTL) and signed by the Master Key. Credentials never leave the vault boundary.

02 — V8 Isolate Sandboxing

Tool code runs inside isolated-vm V8 isolates with 64 MB memory caps and per-request timeouts. No filesystem access, no network access except through the SSRF-guarded fetch bridge.

03 — SSRF Guard

All outbound HTTP requests are DNS-resolved and validated before execution. Private IP ranges (10.x, 172.16-31.x, 192.168.x, AWS metadata 169.254.x) are blocked at the network layer.

04 — DLP & PII Redaction

A ResponseGuard pipeline intercepts every tool response. Configurable redaction patterns strip sensitive fields (emails, SSNs, card numbers) before data reaches the AI agent.

05 — Cryptographic Audit Trail

Every request is signed into a SHA-256 hash chain with Ed25519 signatures. Events form a tamper-proof, SIEM-exportable forensic record.

06 — Honeytoken Trap System

Phantom credentials are injected into isolated environments. If a honeytoken is used outside Vinkius infrastructure, the server is quarantined instantly.

Emergency Kill Switch

EU AI Act Art. 14(1) Compliant

The kill switch is an **emergency halt** mechanism — not a simple toggle. When triggered, it executes three actions atomically:

01 — Server deactivated

The MCP server is immediately taken offline across the entire cluster.

02 — All tokens revoked

Every connection token is invalidated. Total lockout — reconnection blocked until new tokens are issued.

03 — WebSocket connections killed

Active connections terminated via Redis pubsub broadcast. Propagates to every runtime node in the cluster.

Full Visibility. Zero Guesswork.

The Vinkius cloud dashboard includes a full MCP Governance suite — real-time analytics and security controls for production AI operations.

Control Plane

KPI dashboard with request volume, latency, success rate, token consumption, and AI-generated operational briefings.

Agent Activity

Which AI clients are connecting, how often, and what they're doing — real-time session tracking.

FinOps

Cost tracking per tool, payload compression savings, budget optimization signals, and consumption trends.

Tool Health

Slowest and most error-prone tools, with actionable root-cause insights and performance baselines.

Firewall & DLP

PII redaction activity, sensitive data protection counters, and security event timeline.

Incident Log

Error trends, failure rates, status-code breakdowns, and forensic audit trail access.

> Get started at **cloud.vinkius.com** — connect your AI agent in under 60 seconds.

Cable Bolt Design Engineer MCP

4 tools available
Cloud-hosted on Vinkius

You can now bring specialized geotechnical engineering capabilities directly into your AI client. This MCP gives your agent the specific math and logic needed to design cable bolt support systems for underground excavations. Instead of manually running calculations for bolt length or spacing, you tell your agent the excavation dimensions and rock quality, and it handles the geometry.

Once the dimensions are set, the MCP calculates how much load the proposed configuration can actually support. You can then move from raw numbers to a physical layout by generating a specific installation pattern. Before you finalize anything, the MCP runs a safety check to verify that your design meets the required safety factors for the expected loading conditions. This keeps your rock mass stability assessments consistent and grounded in engineering logic.

Core Capabilities

01 — Geometry Calculation

Your agent calculates bolt length and spacing based on rock quality.

02 — Capacity Assessment

The AI determines the total load capacity of a bolt system.

03 — Pattern Generation

Your agent produces physical installation layouts for engineers to follow.

04 — Safety Verification

The MCP checks designs against required safety factors.

One Click on Vinkius — From Prompt to Execution

Available at **vinkius.com/en/ai-agent-connect/cable-bolt-design-engineer** — connect your AI agent in three steps.

01 Connect your preferred MCP-compatible client to Vinkius.

02 Provide excavation dimensions and rock quality to your AI agent.

03 The agent uses the MCP tools to calculate geometry and capacity.

04 Review the generated installation patterns and safety verifications.

Connect your AI client to Vinkius and start running engineering calculations immediately.

Built For

This MCP is built for geotechnical and mining engineers who need to move quickly from excavation data to support designs.

Geotechnical Engineer

Hands off rock mass data to the AI to generate support requirements.

Mining Engineer

Uses the tool to verify that support patterns meet site safety standards.

Excavation Designer

Generates physical bolt layouts for underground tunnel or mine stability.

What Changes When You Connect

01 Reduces manual calculation errors in bolt geometry and spacing.

02 Speeds up the transition from rock mass assessment to installation patterns.

03 Provides instant safety factor verification for proposed designs.

04 Standardizes load capacity calculations across different bolt configurations.

Real-World Applications

Tunnel Support Design

Calculate the exact bolt dimensions needed for a new tunnel excavation based on rock quality.

Mine Stability Audits

Verify if existing or proposed bolt patterns meet safety factors for expected loads.

Capacity Planning

Determine if a specific number of bolts can handle the calculated load of a rock mass.

Layout Automation

Generate a physical spacing arrangement for crews to follow during installation.

4 Tools Available

#	TOOL	DESCRIPTION
01	calculate_bolt_geometry	This tool determines the necessary physical dimensions for bolts based on your specific excavation size and rock quality.
02	calculate_system_capacity	Use this to find the total load a specific bolt configuration can support.
03	generate_installation_pattern	This tool creates the physical layout and spacing arrangement for your bolt installation.
04	validate_design_safety	This tool checks your completed design against minimum safety factors for a given loading condition.

See It in Action

Real prompts you can use once this MCP is connected to your AI agent through Vinkius Cloud.

U What is the required bolt length and spacing for a 10m span with a rock mass quality of 0.8?

For a 10m span and 0.8 rock mass quality, the required bolt length is 4.5 meters with a minimum spacing of 1.2 meters.

U Calculate the total capacity for 20 bolts, each with 50kN capacity and 30kN grout strength.

The total capacity for the system is 1000kN, with an effective capacity of 850kN after accounting for grout strength.

U Is a design with 500kN capacity safe for an expected load of 400kN with a safety factor of 1.2?

Yes, the design is safe. The current safety factor is 1.25, which exceeds the target of 1.2.

Frequently Asked Questions

01 **What AI clients can I use with this MCP?**

You can use any MCP-compatible client, including Claude, Cursor, Windsurf, and VS Code.

02 **Do I need to host the MCP myself?**

No, Vinkius hosts and manages the MCP for you. You just connect and use it.

03 **Can this tool design bolt patterns for mining?**

Yes, it includes tools to generate physical installation patterns and calculate system capacity for mining support.

04 **How does it handle rock mass quality?**

The calculate_bolt_geometry tool uses rock mass quality as a primary input to determine required bolt dimensions.

05 **Can I verify if my design is safe?**

Yes, the validate_design_safety tool checks your design against minimum safety factors for specific loading conditions.

Go Live in 60 Seconds

Get your connection token from **cloud.vinkius.com**, then paste the endpoint URL into any MCP-compatible client.

YOUR MCP ENDPOINT

```
https://edge.vinkius.com/[TOKEN]/mcp
```

CLIENT	WHERE TO CONFIGURE
Claude AI	Profile → Customize → Connectors → "+" → Add custom connector → Paste endpoint
Cursor	Settings → Features → MCP Servers → "+ Add New MCP Server" → Type: SSE → Paste endpoint
VS Code	Ctrl/Cmd+Shift+P → "MCP: Add Server" → add `"cable-bolt-design-engineer": { "url": "…" }`
Windsurf	MCP Settings → `mcp_settings.json` → Add endpoint URL
ChatGPT	Settings → Tools & plugins → Add MCP server → Paste endpoint
Gemini	Extensions → Add MCP Server → Paste endpoint URL

ASK AN AI ABOUT THIS

Let your preferred AI explain this MCP server

- Ask ChatGPT
- Ask Claude
- Ask Perplexity
- Ask Gemini
- Ask Grok

READY TO CONNECT

Cable Bolt Design Engineer is live on Vinkius Cloud.

Get your connection token, paste it into your AI agent, and start building. No SDK. No deployment. Just results.

Start at cloud.vinkius.com →

vinkius.com · support@vinkius.com

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