MCP SERVER | NO CODE | CLOUD HOSTED

Chain Pillar Design MCP for mining.

Get precise stability metrics and pillar dimensions instantly.

Chain Pillar Design MCP provides specialized engineering tools for longwall mining stability. Use it to determine required pillar widths, evaluate safety against operational constraints, predict surface movement, and model how abutment loads shift between yield and chain pillars.

mining | stability | geotechnical | longwall | engineering

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vinkius.com/en/ai-agent-connect/chain-pillar-design

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.

Chain Pillar Design MCP

4 tools available
Cloud-hosted on Vinkius

You can use this MCP to handle the heavy lifting of longwall mining stability calculations. Instead of manually running through geometry and loading scenarios, you give your AI client the mining parameters and get back specific dimensions and safety factors. It handles the math for pillar widths based on your specific seam characteristics and depth. You can also check how your design affects the surface by predicting subsidence or model how loads shift between different pillar types. It's built to help you verify if a proposed design meets your target safety factors before you commit to a layout.

Core Capabilities

01 — Pillar Sizing

Your agent calculates required widths based on depth and extraction height.

02 — Safety Verification

Your agent checks designs against specific target safety factors.

03 — Subsidence Prediction

Your agent estimates surface movement based on seam and pillar data.

04 — Load Modeling

Your agent simulates how abutment loads move between different pillar types.

One Click on Vinkius — From Prompt to Execution

Available at **vinkius.com/en/ai-agent-connect/chain-pillar-design** — connect your AI agent in three steps.

01 Connect your MCP-compatible client to Vinkius.

02 Provide your mining parameters like depth, seam height, and panel width.

03 Ask your agent to calculate dimensions or evaluate stability.

04 Receive specific engineering metrics and safety factor results.

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

Built For

This MCP is designed for geotechnical and mining engineers working in longwall operations.

Mining Engineer

Hands off panel geometry and depth data to get pillar dimensions.

Geotechnical Engineer

Uses the tool to verify stability and predict surface subsidence.

Mine Planner

Runs loading scenarios to optimize pillar layouts.

What Changes When You Connect

01	Calculates pillar widths using specific mining geometry.
02	Checks design safety against operational constraints.
03	Predicts surface movement based on seam characteristics.
04	Models load shifts between yield and chain pillars.

Real-World Applications

Initial Layout Design

Determine the starting pillar width for a new longwall panel.

Safety Auditing

Verify if an existing pillar design meets a required safety factor.

Environmental Impact Assessment

Estimate how much the ground surface will move due to mining.

Stress Analysis

Model how abutment loads redistribute during the mining process.

4 Tools Available

#	TOOL	DESCRIPTION
01	simulate_loading_scenario	This tool models how abutment loads shift between yield pillars and chain pillars. It helps you understand the stress distribution in your layout.
02	evaluate_stability	This tool assesses whether a proposed pillar design is safe. It checks your design against environmental and operational constraints.
03	get_pillar_dimensions	This tool calculates the necessary width for a chain pillar. It uses your specific mining geometry and loading conditions to find the right size.
04	calculate_subsidence_impact	This tool predicts potential surface movement. It looks at your pillar design and seam characteristics to estimate subsidence.

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 pillar width for a 200m panel, 3m extraction height, and 500m depth?

The required pillar width is 45 meters with a stability factor of 1.65.

U Is a 30m wide pillar safe for a 400m depth and 4m extraction height if the target safety factor is 1.5?

No, the calculated stability factor is 1.32, which is below your target of 1.5. The risk level is Moderate.

U Predict the subsidence impact for a 150m panel, 30m pillar, 3m seam, and 400m depth.

The predicted surface movement is 0.12 meters with a Low risk level.

Frequently Asked Questions

01 **What can this MCP calculate for longwall mining?**

It calculates required pillar widths, evaluates design stability, predicts surface subsidence, and models abutment load shifts.

02 **How does the MCP determine pillar width?**

It uses the get_pillar_dimensions tool to process your specific mining geometry and loading conditions.

03 **Can I check if my design meets a specific safety factor?**

Yes, you can use the evaluate_stability tool to check a proposed design against your target safety factor.

04 **Does this tool predict surface movement?**

Yes, the calculate_subsidence_impact tool predicts potential surface movement based on your pillar design and seam characteristics.

05 **What clients can I use with this MCP?**

You can connect this MCP to any compatible client like Claude, Cursor, Windsurf, or VS Code.

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 `"chain-pillar-design": { "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

Chain Pillar Design 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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Platform	Vinkius Cloud for AI Agents
Endpoint	`https://edge.vinkius.com/{token}/mcp`

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