FAQ – Frequently Asked Questions
about Constructing the Great Pyramid
through Multispiral Ramps

1. What is the purpose of this explanatory model?

The model is a re-engineering process.
It reconstructs the construction of the Great Pyramid using only

- geometry
- verified techniques of the Old Kingdom
- historical constraints

It avoids speculation entirely and follows a
single, consistent construction principle from start to finish.

2. Why is efficiency the central guiding principle?

The pyramid had to be completed within the allotted time of **20 years**.
The pharaoh had to still be alive when its construction was finished.
This made efficiency a **non-negotiable requirement**.
Whenever multiple technical solutions are possible, the model selects the one that

- requires the least material
- minimizes labor
- reduces construction time
- fits the technological capabilities of the era

Efficiency becomes a **second source of information**, alongside archaeology.

"**Follow the Efficiency**" is therefore the central guiding principle. Since written construction instructions are lacking, the construction organization can only be reconstructed using criminalistic methods – by tracing the decisions that a chief engineer inevitably had to make to move millions of tons of material in a short time. This is the working method of an investigator who is not looking for a perpetrator, but rather wants to understand the **engineering logic behind a gigantic structure**.

3. Why are there no archaeological remains of ramps?

Because ramps were **temporary structures**. After completion, they were dismantled and the material was reused. The absence of ramp remains is therefore **expected**, not problematic.

The model provides an **archaeological falsification criterion** for increased concentrations of mud bricks in the joints of the outer rock layers.

4. Why not an internal ramp, as proposed by Houdin?

Because an internal ramp

- is a complex, specialized construction
- poses a high risk of collapse
- has no space at the top of the pyramid
- offers insufficient transport capacity
- would significantly extend the construction time far beyond 20 years

The model of the Multispiral Ramps shows that at least **3 transport lanes** and a separate return lane were needed in the middle third of the pyramid.

Houdin's inner ramp offers only a single lane with a width of 2 meters – this is insufficient to justify a construction period of 20 years.

5. Why use multispiral external ramps?

A single wide ramp is extremely inefficient because the ramp volume increases **quadratically with the width**.

Multiple narrow lanes

- require far less material
- can be recycled upward
- allow continuous parallel transport

This makes multispiral ramps the **most efficient solution.**

6. How many blocks were used?

The pyramid consists of

- approx. **3 million standard blocks** (99 %)
- approx. **22,000 casing stones** (0.7 %)
- approx. **200 large granite blocks** (0.2 %)

The project is therefore primarily a **mass-transport challenge**, not a lifting challenge.

7. How many workers were involved?

- **10,000 permanent workers** year-round
- **+10,000 seasonal workers** during the Nile flood
- approx. **35 working hours per week**
- humane working conditions, not slavery

The site functioned like a **large, well-organized industrial operation**.

8. Why were sledges on wooden rollers used?

Because they

- have 2.5 times less friction than sliding sleds on Nile mud
- eliminate the need for water carriers
- avoid slippery ramp surfaces
- shorten the construction time by about 30 %

For blocks up to 5 t, wooden rollers are the **optimal transport technology**.

9. How were the large granite blocks moved?

The huge blocks were not pulled up the outer ramps.
They only made up 0.2 %.
Instead, they were

- placed on the horizontal surface of the pyramid
- lifted upward using **zigzag lifting** (2° ramps)
- installed by 60% of the pyramid's height

This kept the mass-transport system uninterrupted.

10. How is the construction time calculated?

The time depends on

- number of blocks per level
- transport capacity per lane
- number of available lanes
- average annual number of workers

Using the middle level (Level 109) as a representative average yields:

- **18.5 years** for the stepped core
- **+1.5 years** for the casing
- **≈ 20 years total**

This matches historical accounts precisely.

11. Can the model be falsified?

Yes. It provides clear **falsification criteria**, such as

- ramp angle
- number of transport lanes
- transport throughput
- ramp volume
- worker productivity

If any of these values were proven impossible, the model would require revision.

12. Why is the model so robust?

Because it

- uses no speculative assumptions
- is fully deduced from constraints
- integrates all subsystems (ramps, transport, labor, time)
- matches historical sources
- reproduces the 20-year construction time
- is mathematically verifiable

It is not a "maybe" model — it is a
"this is what must have worked" model.

The combination of archaeological findings and efficiency considerations produces a clear and unique decision in every decision-making process.

The individual decisions are explained in detail in Tables 1 to 10.

Applying the calculation method used for the Great Pyramid to the **Red Pyramid** yields a construction time of 12 years.
This is close to the result of Rolf Krauss and John Romer, who evaluated just under 11 years. They determined the construction time archaeologically based on graffiti representing the construction phases.

January 24, 2026

Rudolf Volz