

'Surya Tilak' Ceremony At Ayodhya's Ram Temple

Why In News

- The grand Ram Temple in Ayodhya witnessed a unique event as the forehead of the Ram Lalla idol was anointed with a ray of sunlight, known as 'Surya Tilak' on the occasion of Ram Navami. A *three-minute-long Surya Tilak* ceremony — where a beam of sunlight was projected onto the forehead of Lord Ram's idol — was performed at noon. This was achieved **using a special mirror-lens arrangement**, designed by astronomers at the **Indian Institute of Astrophysics (IIA), Bengaluru**, that has been installed in the building by a team from the **Central Building Research Institute, Roorkee**.



How Does It Works

- Using cutting-edge scientific expertise, a **5.8 centimetre beam of light** hit the deity's forehead. To achieve this remarkable phenomenon, a specialised instrument was designed.
- A team of ten esteemed Indian scientists stationed at the Ram Mandir ensured the success of this auspicious event on Ram Navami. For **approximately 3 to 3.5 minutes starting at 12 noon**, sunlight was precisely directed onto the statue's forehead using a combination of mirrors and lenses.



- Commissioned by the temple trust, scientists from a leading government institution devised a sophisticated apparatus consisting of mirrors and lenses. This mechanism, officially termed **the 'Surya Tilak mechanism'**, marks a significant scientific and engineering feat.
- "The **opto-mechanical system consists** of four mirrors and four lenses fitted inside the tilt mechanism and piping systems. The complete cover with an aperture for the tilt mechanism is placed at the top floor to divert the sun rays through mirrors and lenses to the Garbha Girha," Dr Ramacharla said.

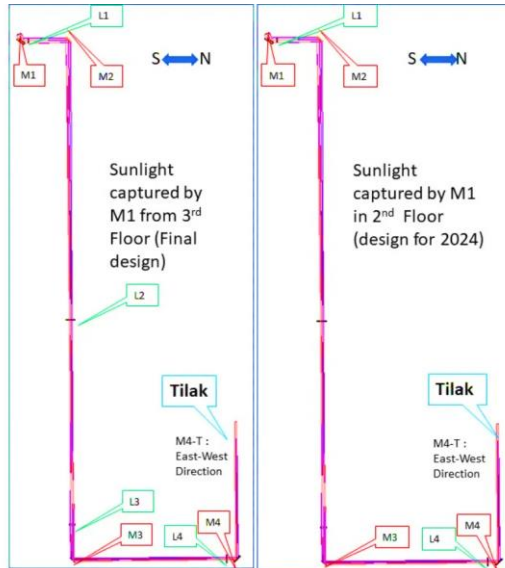
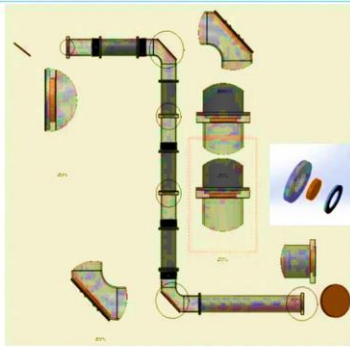


- "The **first mirror**, responsible for receiving the sunlight, has to be positioned at an angle along the path of the sun rays," she explained.
- The **light will then be reflected to three other mirrors**, and will pass through four lenses until it is of the desired intensity, and will be directed to the idol's

forehead. The mirrors directed the beams while the lenses made them converge to the required intensity.

How the system works

Concept: Periscope with Mirrors & Lenses
 Number of mirrors: 4 (M1, M2, M3 and M4: Flat)
 No tracking for Sun in East-West direction
 Number lenses used : 4 (L1, L2, L3 L4)
 M1 shifts position every year (19 year cycle)



- "The final lens and mirror focus the sun rays on the forehead of Shree Ram facing east. The tilt mechanism is used to adjust the first mirror's tilt, sending the sun rays towards the north direction to the 2nd mirror to make the Surya Tilak on every year's Shree Ram Navami. All the piping and other parts are manufactured using brass material.



- The mirrors and lenses are of very high quality and durable to sustain a long period. The inner surfaces of pipes, elbows, and enclosures are black powder-coated to avoid scattering of sunlight. Also, at the top aperture, an infrared filter glass is used to restrict the Sun's heat waves from falling on the idol's forehead," he added.

- The development of the 'Surya Tilak' mechanism involved collaboration between scientists from CBRI, Roorkee, and the Indian Institute of Astrophysics (IIAP), Bengaluru.
- Employing a special gearbox and using reflective mirrors and lenses, the team orchestrated the precise alignment of sunlight rays from the temple's third floor to the inner sanctum (Garbha Griha) using established principles of solar tracking. Technical support from the Indian Institute of Astrophysics and the manufacturing expertise of Optica, a Bengaluru-based company, further helped the project's execution.



- **India's premier institution in the field of astronomy**, the Indian Institute of Astrophysics (IIA) in Bengaluru, has devised a solution to reconcile the apparent disparity between the lunar and solar (Gregorian) calendars. "We possess the requisite expertise in positional astronomy," elaborated Dr Annapurni Subramaniam, Director of IIA, adding, "This expertise was applied to ensure that the Sun's rays, symbolised by a 'Surya Tilak', could ceremoniously anoint the idol of Ram Lala on every Ram Navmi."
- **A similar 'Surya Tilak' mechanism** already exists in some Jain temples and at the Sun Temple at Konark, but they are engineered differently.

