Relief Displacement and Object Height on a Vertical Photo

Height of an object such as a building or tower from its relief displacement on a vertical aerial photograph, the radial distance of its top and the flying height.

Method: Relief displacement on a vertical photograph

Input parameters

Unit system: SI

Parameter	Value	Unit
Radial distance of the top from the principal point	82.500	mm
Relief displacement (top minus base)	2.1000	mm
Flying height above the object's base	1,500.0	m

Calculated results

Parameter	Value	Unit
Object height	38.182	m
Radial distance of the base	80.400	mm
Displacement as a share of radial distance	2.5455	%

Notes for this case

• On a vertical photograph objects lean radially outward from the principal point: d = rh/H, so h = dH/r, with r measured to the top and H the flying height above the object's base. Displacement is zero at the principal point and grows outward and with object height; orthophotos remove it. Use the same units for r and d.

Formula and method

$$d = \frac{rh}{H}, \quad h = \frac{dH}{r}$$

Variables

r	Radial distance of the top from the principal point	m
d	Relief displacement (top minus base)	m
H	Flying height above the object's base	m
h	Object height	m
r_b	Radial distance of the base	m
d/r	Displacement as a share of radial distance	-

Method and standards

Relief displacement.

Assumptions and limits

- Truly vertical photo; flat base area.

References

Relief displacement on a vertical photograph

Report details

Report reference	FCC-NYQ8-T1X0 (the same inputs always give the same reference)
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Calculator	Relief Displacement and Object Height on a Vertical Photo
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Release checks	3 reference cases of this calculator, computed independently, are checked on every release

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/civil/surveying/relief-displacement-height

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.