

## **Appendix X. How to use Transits, Laser Levels and Optical Builder's Levels.**

A transit or builder's level can be used to determine the difference in elevation between two points at a distance. A level does only one thing – establishes a level line when set up on tripod. A transit can also establish a plumb line, when looking through scope or sight. Also, a transit base is marked with the full 360 degrees of a circle, so when rotating sight around on tripod, basic surveying can be done.

Optical levels and transits operate easily. Once placed on a tripod and adjusted (made level themselves), they project a level line when looking through instrument. This means any spot looked at which is right in the crosshair middle is at the same elevation as thing looked at moments before. When used in conjunction with a grade pole (a stick or pole marked in feet/inches or meters), a level or transit enables one to determine elevations with great accuracy.

Let's say the difference in elevation between two points on a site wants to be determined. First, set up level or transit in a location so after adjusted, the sight line through crosshairs is higher in elevation than the two points to be compared. Now, look through the instrument while a second person takes the grade pole and places on one of the two locations. Hold grade pole plumb and take reading. As an example, the first reading is 3 feet 3 inches. Send grade pole holder to second point and repeat. If the crosshair hits at 4 feet 6 inches, then difference in grade between the two is 1 foot 3 inches.

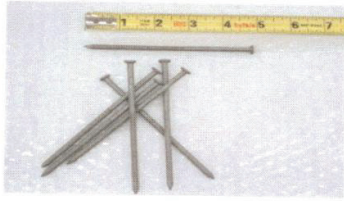
Optical levels and transits are highly versatile. When placed on a tripod, they can rotate a full 360 degrees. This allows a level to be set up and take readings in any direction. The operation speed depends upon how quickly the grade pole person can move from point to point, and how quickly one can locate grade pole in the cross hairs, focus and take a reading.

Levels and transits are made to withstand dusty construction site conditions. They can withstand wet, heat and cold. However, dropping means trouble as these instruments are delicate in regards to impacts. Optical lenses can be knocked out of adjustment, as well as the leveling screws which are used to level instrument on tripod. Only a professional service center can realign an instrument.

Using a level or transit requires some practice. The method of setting up tripod is somewhat tricky, especially on sloped surfaces. Muddy or unstable soil can be a problem. If soil under tripod moves slightly when rotating level some readings may be in error.

By using a laser level, the necessity for a second person is eliminated. They set up the same as the optical instrument, however to use turn on laser and a fine, thin, red light beam begins rotating. By using a special grade pole, which has a sliding target, and moving from point to point, target can be slid up and down pole until laser hits the target center.

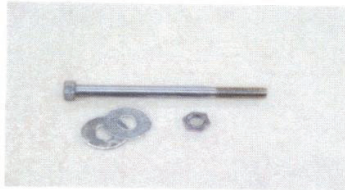
# Hardware Pictures



**40d Nails**



**Joist Hanger (2'x4')**



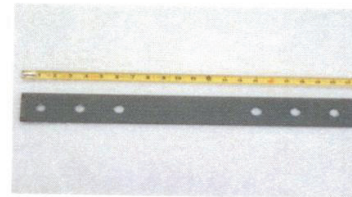
**Bolt, Nut, Washers**



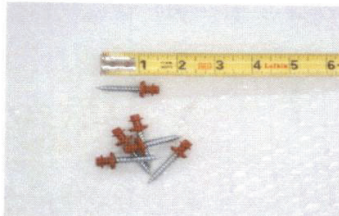
**Joist Hanger (2'x6')**



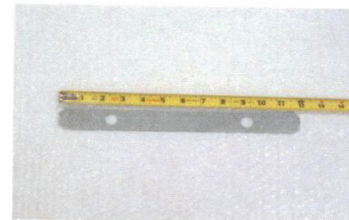
**Stitch Screws  
Length: 3/4"**



**KHST**



**Diaphragm Screws  
Length: 1-1/2"**



**LSTA12**



**Eave Light Screws  
Length: 1"**



**RT15**



#### Outside Closure

Outside closures go beneath ridge caps. On buildings with a pitch break they go on top of the fascia boards. On a monitor building they will go on top of the lower roof steel, under the flashing to the higher wall.



#### Vented Closure

Vented closures go beneath ridge caps.



#### Inside Closure

Inside closures go on top of the fascia boards for buildings with enclosed sidewall overhangs.



#### EM Seal

Used between valley flashing and roof steel as well as between roof steel and corner/rake trim on flying gables and widow's peaks.



#### AYR-foil Insulation

Roof and wall insulation.