

SMA Pilot Balustrade Level I

Balustrade Installation - Education Committee Class

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Presented by: Quarter Turn Dave

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Staircon – Elecosoft

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Hi Folks,

This is a greatly reduced representation of the Power Point used in the three day class.

Quarter Turn Dave

By: Quarter Turn Dave

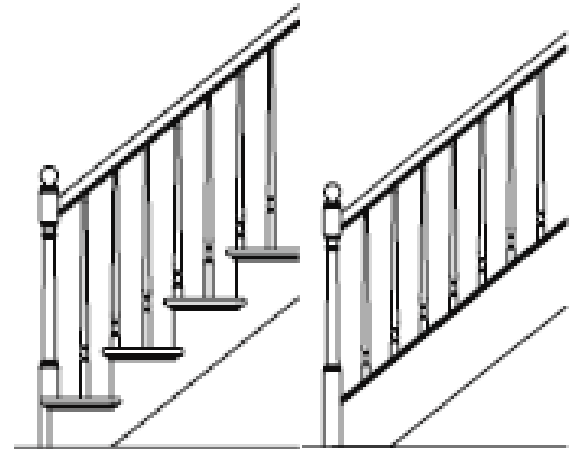
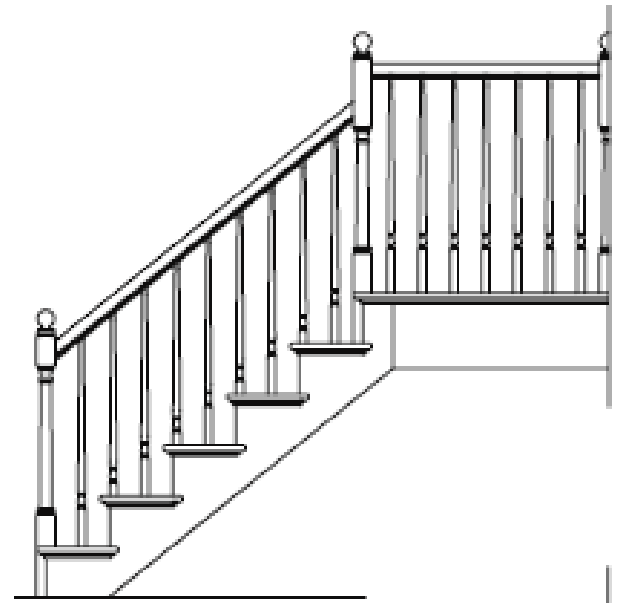
Balustrade - Post to Post

Balustrade Level I Pilot Class teaches geometry, layout, some machining and attachment of component pieces for installation of a Post to Post Balustrade used around the Country. This will include guards for both closed and open string and balcony's. This class will instruct the new installer how to achieve the goals of a strong pleasing functional balustrade system.

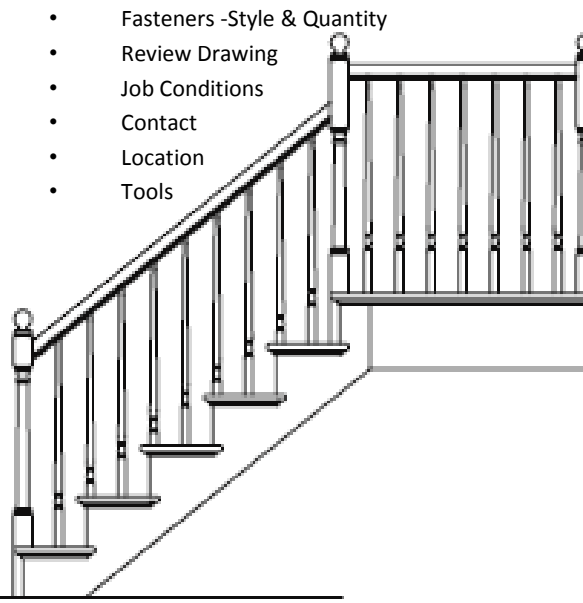
The class will instruct the new installer how to achieve the goals of a strong pleasing functional balustrade system focusing on why the basics work as we teach each section building the system. Everything in this class is tried proven and used by masters of the past from timber framing to todays construction.

We start with IRC Code applications in layout determining the location of the newel, baluster and balustrade height from paperwork of materials selected to build a balustrade. We delve into centering which poses conditions set by Company standards, and job conditions covering newel mounting via surface , notching or a combinations of both to various parts of the stairway and floor systems. Next is mounting handrails to newels and walls with different fasteners and finally baluster attachment, with a mix of mounting styles, fasteners and procedures. Component connections must be strong showing no joinery cracks and be able to withstand code testing. The following pages are excerpts from the Power Point lead class.

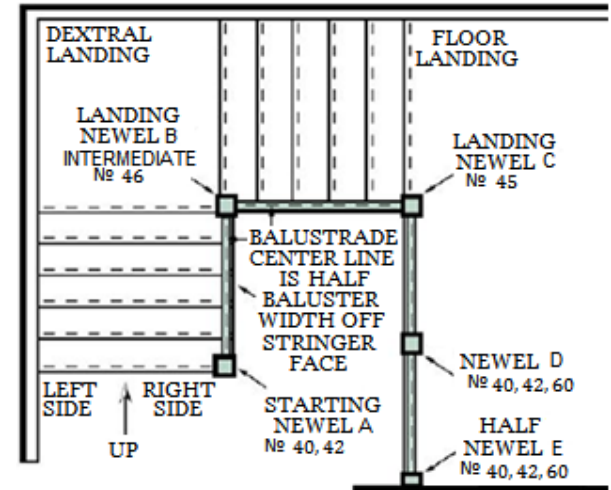
Quarter Turn Dave



- Newels -Style & Quantity
- Balusters -Style & Quantity
- Rail -Style & Quantity
- Cap & Shoe -Style & Quantity
- Landing Tread -Style & Quantity
- Fascia -Style & Quantity
- Fasteners -Style & Quantity
- Review Drawing
- Job Conditions
- Contact
- Location
- Tools



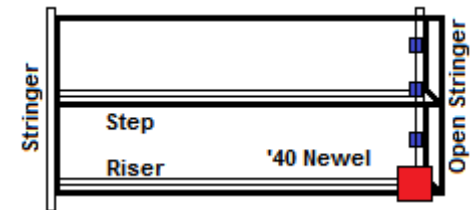
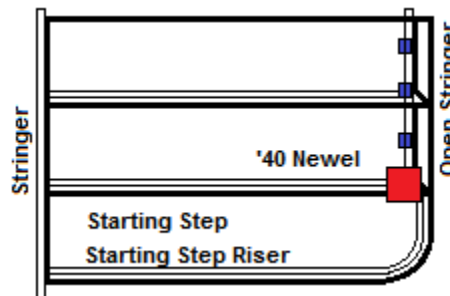
- Add up the pieces count, see paperwork & drawing
 - Verify newel count, style
 - Verify Rail height, it effects the Baluster lengths
- Three Baluster installs:**
- *For 34" rail IRC Baluster length - 34", 36", 39"
 - For 36" Rail IRC Baluster Length - 36", 39", 42"
 - For 38" Rail IRC Baluster Length - 39", 42", 45"
 - *Balusters needed; 2- First Step 2/36", 2/39"
 - *Balance of Balusters on Treads; 8/34", 8/36", 8/39"
- Two Baluster installs:**
- *For 34" rail IRC Baluster length - 34", 39"
 - For 36" Rail IRC Baluster Length - 36", 42"
 - For 38" Rail IRC Baluster Length - 39", 45"
 - *Balusters needed; 1- First Step - 2/39"
 - *Balance of Balusters on Treads; 8/34", 8/39"
 - Note if grouping balusters over equal centers is used
 - Newel block size needed; 2½-5", 1-10", 1-13"
 - *16' of Balcony Balusters; 45/36"
 - Baluster heights may vary from style to style
 - Newel Drop, Landing Tread, Fascia & Trim
 - Fasteners for; Newel, Rail, Baluster, Fascia, Trim



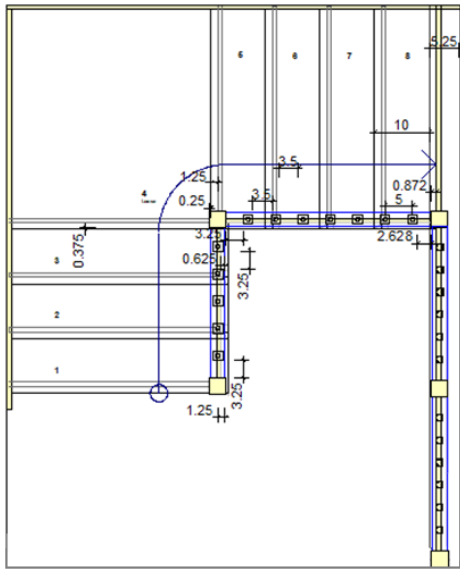
Newels Types by location in the example are: **A-4040** is a starting newel, **B-4046** is a intermediate landing newel, **C-4045** is a landing newel, **D-4042** landing newel and **E-4042** is a half newel. The basic difference while in the same style is the length of each plinth and square block and where it fits in the system. The starting newel **A**, could be the same as newel **D** & **E** having a 5" top block and short plinth block with **E** ripped forming a half newel. Landing newel **B** is different with the top block between 12"-13½" to receive the two different height rake rails. It's plinth block is longer allowing it to reach the lower stair stringer for notch lapping. Landing newel **C** top block is 10" with a similar long plinth to reach the bottom of the stringer for notch lapping.

Verify, verify, verify:

- May be required to log the truck, mileage, fuel, condition
- Understand the materials and job matched to paperwork
- Have the exact material as indicated on the paperwork. If something looks odd ask now, clarity is a good friend
- Note if extras are indicated on paperwork, if not ask for extras
- Does the job need different tools, bits, fasteners, adhesives
- Remember you are the last person to interact with the Customer. You will be the one they remember. Be professional, be curious, be mindful of surroundings and CLEAN your mess.
- Turn in extra materials with customer signed paperwork



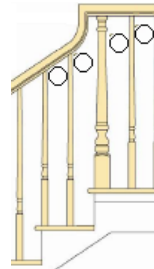
Starting Newel is used at the bottom or beginning of a stairway. This newel can be changed from style and size and manufactured as a ornate custom. The drawings above show two styles of starting newel with different starting tread applications.



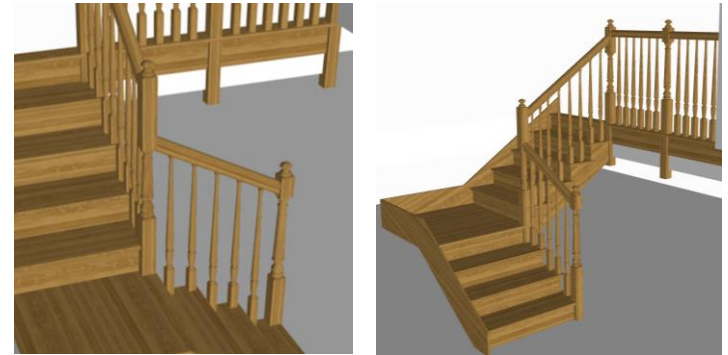
The backbone of any balustrade installation is the placement of components. Each employer or installation will have different required placement for the centerline of the balustrade. For this class we will cover the basic standard slightly modified around the country. This is the finest detail work required, workmanship is not an option.

First locate the centerline, your employer may have default locations, ASK! In this exercise we are using half the baluster plinth width to determine the centerline of the balustrade and the baluster plinth flush with the stringer or bracket and riser for an open stair. If it has a quarter space landing as shown in Fig. 4, both stairs will create a common center line point for the dextral quarter space landing newel...

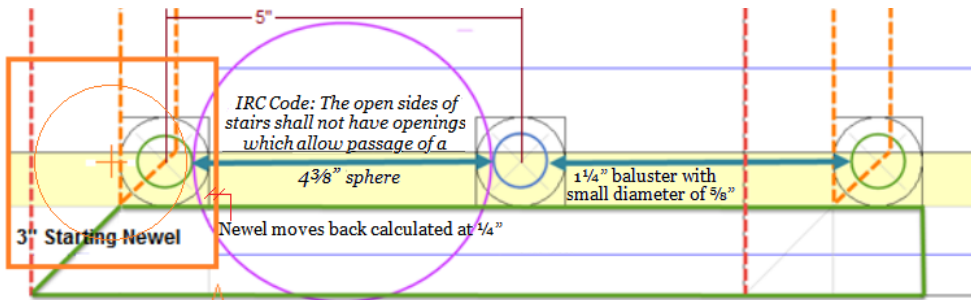
With rake guards using two 1 1/4" pin top, square block or iron baluster on a 10" run another calculation is required. The 4 3/8" sphere rule for calculating the distance between a two balusters and/or a newel at the smallest turn cut area. The small turn cut in a newel is deeper than the 1/2" turn cut on a 1 1/4" baluster or iron... measure the small diameter with calipers on the newel and baluster, subtract half from the plinth dimension of each, you will see a newel small turn cut is deeper than a baluster small turn cut. Baluster centers, newel location or both must be adjusted. The 4 3/8" sphere must not pass on a rake, 4" on the balcony.



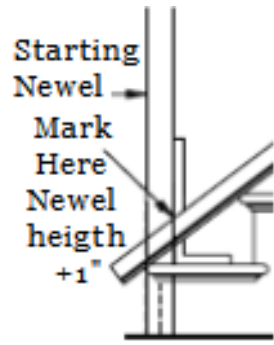
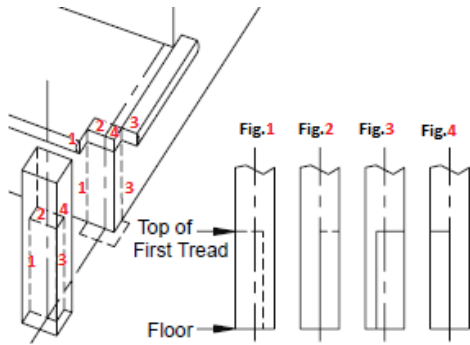
Also remember to adjust for the baluster spacing sphere rule. Fig. 5 & 5a shows the newels in a desirable location for this layout. The balcony newel location Fig. 5 is placed in the similar location allowing the baluster plinths to align on the fascia or apron face. This is the first and easiest way to layout an intermediate landing newel on a dextral or sinistral landing. Also be mindful of the wall termination. Be sure to check the newel to wall measurement for code on 36" wide. VI R311.7.1



If the sphere rule is not checked and allotted for the stair balustrade will be out of code right here at the newel. By moving the baluster and balustrade center line and newel as necessary at the intermediate and landing newel location will bring the sphere rule back into code. For the starting newel just move the newel back a little. This will become second nature to you as you progress. At no point are rake baluster spaces allowed to be greater to allow the 4 3/8" sphere to pass between balusters or baluster and newel or the 4" sphere on a balcony balustrade. If need be lay the parts on flat on the floor to verify your math. R312.1.3 VI 2012



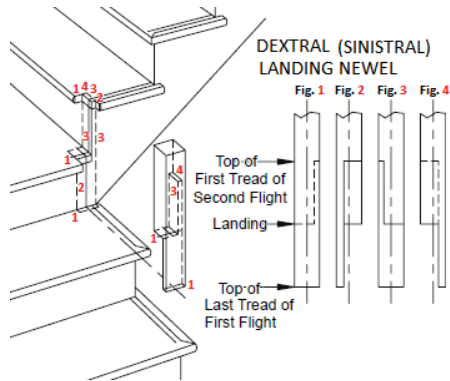
Drawing to the left indicates baluster plinth side is flush with stringer and riser. It also shows the starting newel needs to be placed further back for the 4 3/8" sphere rule. Manufacturers use different top pin diameters from 1/2" - 3/8" - 3/4" small diameters... diameter shown here is a 3/8" pin top and will not pass code, a 3/4" will. Note the orange square and circle indicates the newel. Did it miss the placement as well.



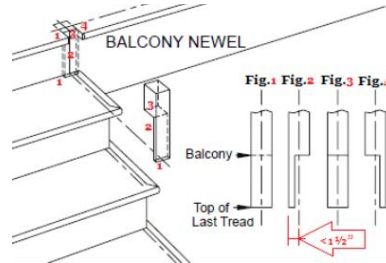
Now that the basic layout is complete with baluster and newel locations and the handrail heights, the balusters and newel lengths can be determined. If done correctly the back of the baluster and newel plinth is not same distance?

If there is a intermediate landing newel or landing newel start here. Arriving at the newel height is simple with the pitch block and ruler. Clamp the rake rail on the stair and mark the vertical line on the handrail with the pitch block at the starting newel plinth location. This is the exact angle of the handrail ready to cut if the tread is level...baluster length, measure the raise length from under the handrail to the tread at each baluster center line, plus the raise length and add 1" for the baluster pin insertion length or 1/4" for square top in plowed handrail, baluster lengths set.

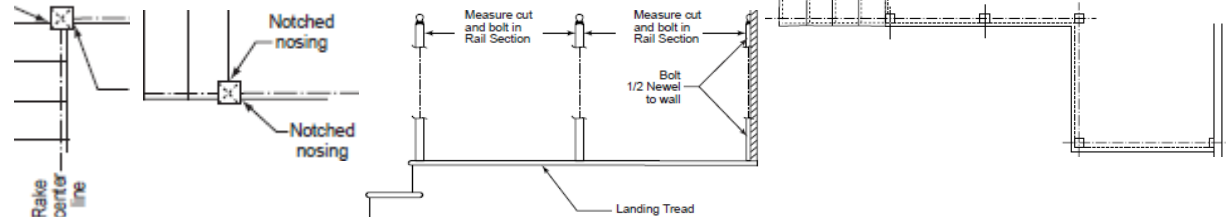
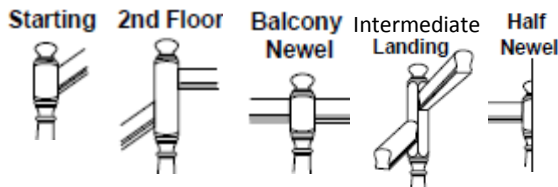
With the tread to newel height marked and cut on the newel the rest of the measurements can be made for the notch location and depth of cut №1 & 3. Very keen measurements need to be made along with the best joinery possible. Using a bevel square check the miter on the stringer and riser for...check for cupping of the riser and stringer. Continue with the tread length cut #2 as determined from the layout for the height of the newel, cut stop at both vertical lines #1 & #3. With the starting newel cut, finished and checked for plumb in place. The anchor holes would like to be in the tread and riser. Your employer will have additional process here with regards to locations, glues or adhesives and fasteners. Lightly fasten this newel for now.



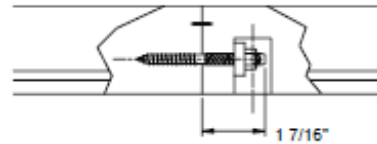
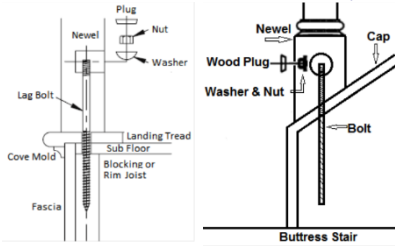
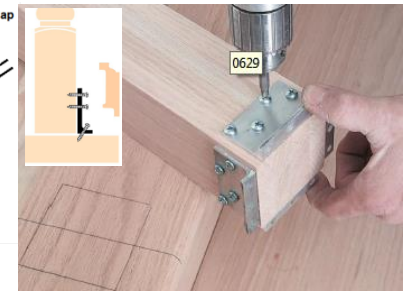
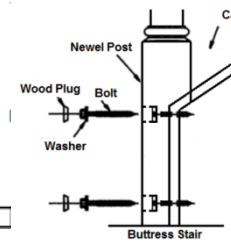
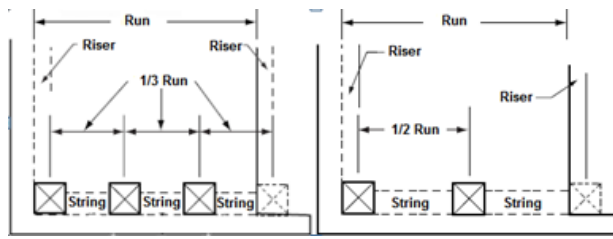
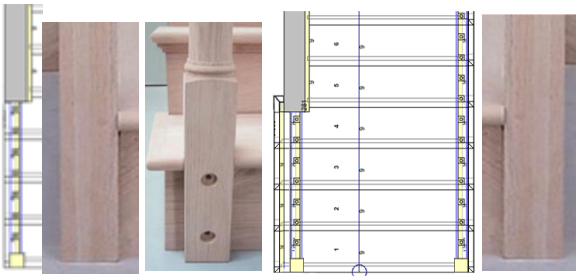
Here the vertical cuts #2 and #3 consist of two #3's and two #2's as the blade will not make a full cut. Make all vertical cuts, then the horizontals. The lower portion of the notch will just fall off leaving the top upper flight notch to chisel. Can a surface mount work in this position if it was used on the starting newel?



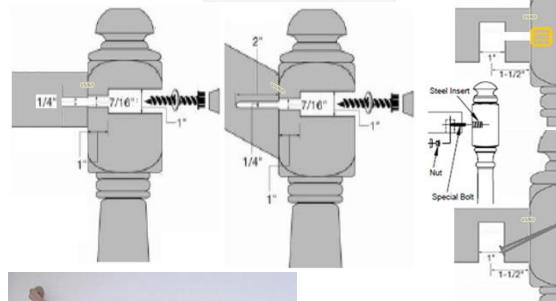
The landing newel layout is the last done in the balustrade and last cut. The procedure starts like the starting newel ... until the layout cut lines. The balcony handrail height is calculated the same but at 36" balcony raise height; rake at 34 1/8" balcony at 36 1/8". This sets the newel height on the landing to calculate the horizontal cuts. Just measure down from the top block and accurately marking the plinth.; you now have balcony baluster length. Check the wall termination point.



Starting installing at the termination point. Apply the half newel or rosette through a rail bolt into solid blocking. If instructed to set blocking try to remove just enough sheet rock to allow the half newel or rosette to cover the hole on the backer framing at the handrail location. Using a longer hanger bolt ...



Using brad point drills, drill a $\frac{1}{4}$ " hole in a scrap of handrail. Measure $\frac{15}{16}$ " up from the bottom and centered in the end to make a templet. Use a square cutoff cut earlier for the rake rail. Using dowels or finish nails drill one or two nail or $\frac{3}{8}$ " holes about $\frac{3}{4}$ " down from the top of the handrail in the widest part and about $\frac{1}{4}$ " apart, centered. Mark one side of the cut off...



Square top balusters mainly use plow hand rail, cap and optional shoe rail. Layout and prepare the newels as indicated earlier. Cap should be installed prior to the newels on curb walls. Shoe rail would directly install on the butress stringer... With the cut shoe rail and handrail done in the prior lessons ...is used to determine the height of the balusters. You may use a pitch block or measure method however, lay the handrail on the cap or shoe rail to transfer the baluster marks...two styles of attachment is used to secure the baluster plinths, screws from below or toe nail with medium T-nail or small trim screw on the baluster plinth into the shoe rail where the fillet covers. For elevated shoe rail on open stairs please use screws from under the shoe rail. VI R312.1.3 -46

Upon completion follow guidelines noted below and/or company procedures as specified.

- Confirm everything meets code requirements.
- Double check to insure all surfaces are sanded clean, all joints are secure, tight & clean.
- Clean-up job site: vacuum/sweep/dust, remove trash & prepare for next step.
 - Attach cover protection such as paper or cardboard if provided if site is *not* ready for occupation.
 - Prepare for owner/occupant access.
- Clean/ pack tools & remove from jobsite.
- Inventory supplies & materials; create list, if necessary, to adjust invoice accordingly.
- Materials; address any leftovers, store or return/restock any usable leftovers or save for finish samples.
- Notify Owner or job lead that staircase is complete, answer any questions
- ***Request signature for job approval/completion.***
- Take Pictures - be sure to capture all angles and details.
- Confirm monies collected match the invoice if required.
- Follow up with 'Thank You' and ask for future references.

Wall rail codes require the ends to be returned to the wall instead of using lambs tong or vertical volutes. Quarter turns are usually used for this termination combined with a rosette attached to the end of the handrail into a stud. It is recommended to cut a pocket in the sheetrock at a stud...solid piece of wood flush with the sheetrock and cover with the rosette. All three parts anchor to each other to the stud. Handrail brackets support the wall rail through the middle of the field. Remember the code height and use wall rail brackets at 4' spacing minimums; check with your employer.

VI R311.7.1 Photo 3; VI R311.7.8.1; VI R311.7.8.2 Drawing 28, Photo 29-31

