

This photo was taken just before the curve coming into the south end of Summivile yards.

Getting To The Bottom Of Stone Culverts

By Ronald J. Stanulevich

Introduction And Photos By Ronald J. Vassallo

The following came from correspondence I had with Ron Stanulevich via the now defunct O&WRHS Yahoo Group in 2003 after posting some culvert photos I had taken between Mamakating and Summitville, NY.

I took these photos on Saturday September 27, 2003. All of the culvert photos except one were taken on the mainline north from Mamakating and Summitville. The other photo was taken on Red Hill Grade in 2011. I have also added some other photos taken in 2011 and 2015 to round out this article. The header photo on this page was not in the original article, and was taken in 2015, but I thought it deserved to be the lead photo as it was one of the most detailed shots I have of a large stone culvert.

The following is the original unedited response from O&WRHS member Ron Stanulevich, and no, I did not crawl in any of the culverts as suggested by Ron (read on), except the larger ones. I hope to go back in the near future and re-shoot some of these in better detail. (I did do this in 2015 and you will see some of those photos as well). The following is what Ron Stanulevich sent to me:

I guess maybe one has to be an engineer and/or a railway historian to truly appreciate the aesthetics of drainage culverts, but anyone with any interest at all in vintage railroad right-of-way construction should follow the links in the "files" area to the amazing pictures of the culverts that Ron posted (They are now posted in this article). You are in for a real treat.

Back in the early steam era, before poured concrete was widely available, stone was the only viable material from which to create lasting, high-carrying-capacity railroad structures. (Wood was biodegradable in railroad applications, and even cast iron was relatively brittle and prone to corrosion by water.) The New York & Oswego Midland built some true marvels in stone that seem to only get better with age.

Good seamless building stone lasts essentially forever when placed solely in compression, so true arch culverts are virtually indestructible as long as they were properly designed and built to prevent their being



undermined by floodwaters. Stone slab culverts have the top slab carrying some shear tension loads, so some of the larger slab culverts could, and did, eventually crack and fail. Smaller slab culverts also lasted essentially forever, like good arch culverts. With that background as introduction, two of the photos in Ron's culverts files merit special mention - one big culvert and one small.

Big: The above photo is as perfect an example of a large stone arch culvert as you could ask for. Talk about combining visual appeal and pure function. Look at the height of the embankment this structure is still successfully carrying. (Did you measure the opening size of this one, Ron?). It is still in virtually as-new shape after 130 years, the last 56 with no maintenance attention at all. Even modern cast concrete structures would not be in this good condition after this many years, having had the porous surface spalled off and cracked by frost action decades ago.



Small: Photo above shows about as small a stone slab box culvert as would ever have been built on a railroad. Engineering texts warn against building box culverts with clear spans under two feet square, on account of their being certain to immediately plug with drift and subsequently wash out. I guess this ancient culvert never read a modern engineering text. No formal Japanese stone garden ever held a more appealing little monument to the spirits of our departed (railroading) ancestors.

To complete this tribute to the arcane, I'll conclude with this observation. While culverts may seem to be simple and straight forward structures, they are actually a bit like icebergs - most of the really interesting and important bits are hidden underneath the surface. Well-engineered culverts like these examples, capable of lasting over a century, have any number of well-kept and subtle engineering secrets in their construction, buried below and behind what you see at the ends. If you asked a layman to draw a guess at the cross-section of a culvert like this, they would leave out about 50 percent of the stone that is really in there.

Ron - your next assignment, should you choose to accept it, is to go back to these culverts with a set of powerful, portable camera lights, a good SLR, lens, and a fiber optic probe. Crawl through the bore from one end to the other, taking a complete set of photos of the inside, top and bottom and underneath, as you go. These pictures will answer all of my many questions about which of the several complex and fascinating engineering options the Midland selected in designing and building its stone culverts. Which of the available engineering choices would provide the longest service life was a hot topic of debate in the engineering fraternity, way back when these culverts were built and the science of railway engineering was young. I think the Midland builders obviously made all the right choices, and knowing which design options they used would settle that ancient engineering argument, once and for all.

Thanks for posting these Ron...RJS.

P.S. Unfortunately we lost Ron suddenly many years ago and I lost a good friend and mentor. I still had so many questions to ask him but sadly that will never be. I cherish all the articles he wrote for the website.

The following photos were taken on a cold, crisp Christmas Day in 2015. A fellow O&WRHS Member and I hiked from Mamakting Depot all the way to the Summiville Station grounds.

I have to point out that not only am I fascinated with culverts I am in amazement and awe at how they are still doing their job on the Shawangunk Ridge, some over 130 years later.

If you are thinking of visiting these culverts I suggest the best time is early Spring before the leaves come in and the melt is coming off the mountains. The surprising thing is you will hear the sound of the water coming through the culverts before you would ever find them by sight.







This culvert was built in the 1880's by the Oswego Midland and it was done using compression fit stone, meaning there was no mortar used at all. Just imagine all the engineering that went into such a structure, especially the arch itself. As I mentionjed previously, but worth repeating again, is how I am fascinated that these culverts are still doing their job of draining water under the O&W mainline down into the D&H Canal over 130 years later! You have to remember these builders never envisioned the railroad going out of business so they built these to last for hundreds of years and hopefully they will still be here for future generations to explore and enjoy.

If you would like to visit this culvert, head North from Mamakating Depot towards Summitville for about 1.5 miles just before you come out of the tree canopy. If you pass the sandpit, you went too far. The best time to visit is early spring when the water is melting off the Shawangunk Ridge and you can find it by the sound of the rushing water.







East side of the culvert posted on the previous page. Why this side is smaller remains a mystery but the only expnation I can give is the different loads that each end was carrying.













The Following photos were taken By Ron Vassallo on 5-12-11 on a hike with Jeff Otto up the Red Hill grade just outside of Summitville heading noth. The two larger culverts were taken just off Red Hill Rd.







