Installation of Quiet Ride noise reduction earmuffs in Shoei Neotec Helmet

Front view of used Shoei Neotec large size helmet showing no signs that it has Quiet Ride noise reduction earmuffs installed in the helmet. reduces engine sounds from stock exhaust motorcycle and wind noise by over 50% at ears.

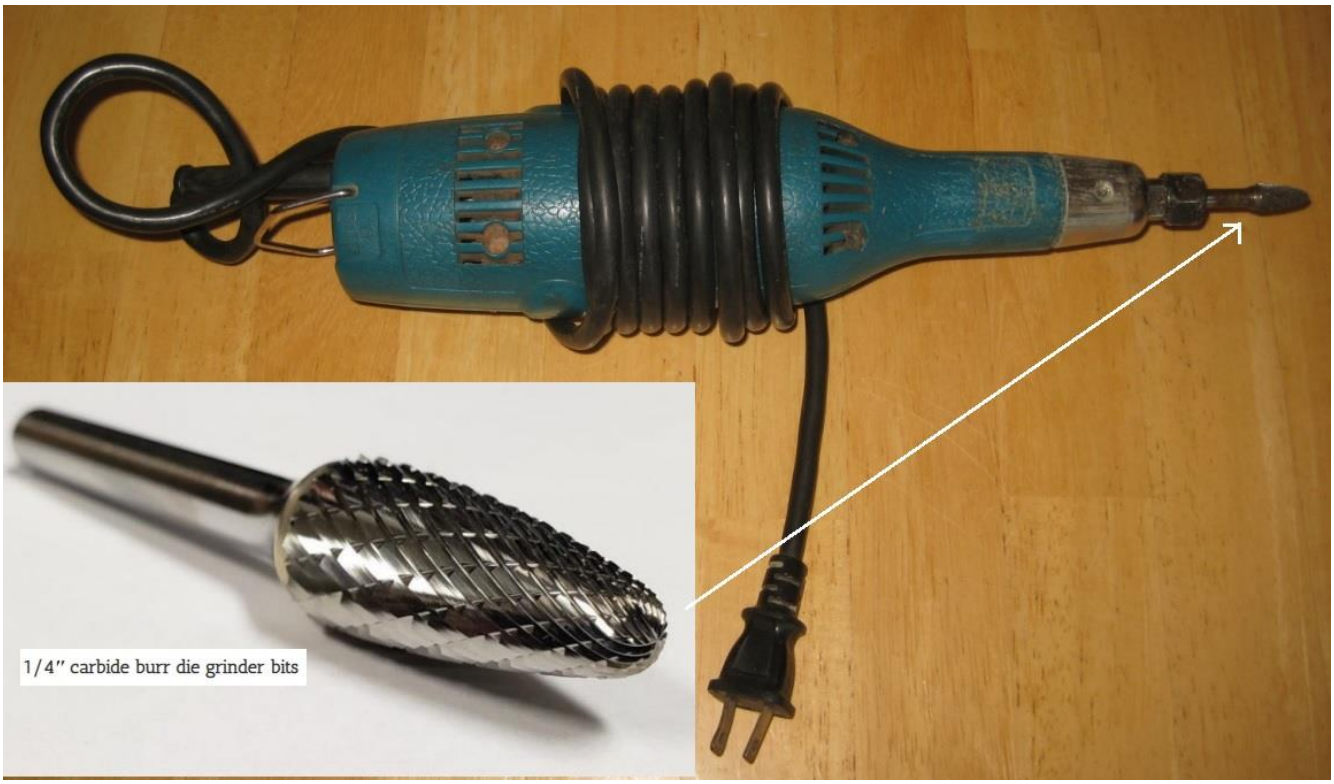
Thin noise reduction earmuffs shown in helmet will reduce wind and engine noise at ears by over 50%

Loop Velcro is stuck on back side of earmuffs that will Velcro to air bladders with hook Velcro stuck on air bladders shown later in pictures.

First step, remove side padding shown in picture below. Grind off chin strap metal connection to helmet and cut off secondary connection. They are in the way for installing air bladder under earmuff in earmuff pocket.

Using a high speed grinder with a 1/4" carbide burr die grinder bit works very well to grinding off factory installed metal chin strap.

I use a high speed grinder with a 1/4" carbide burr die grinder bit to grind off ends of pop rivet holding metal chin strap connection to the helmet.

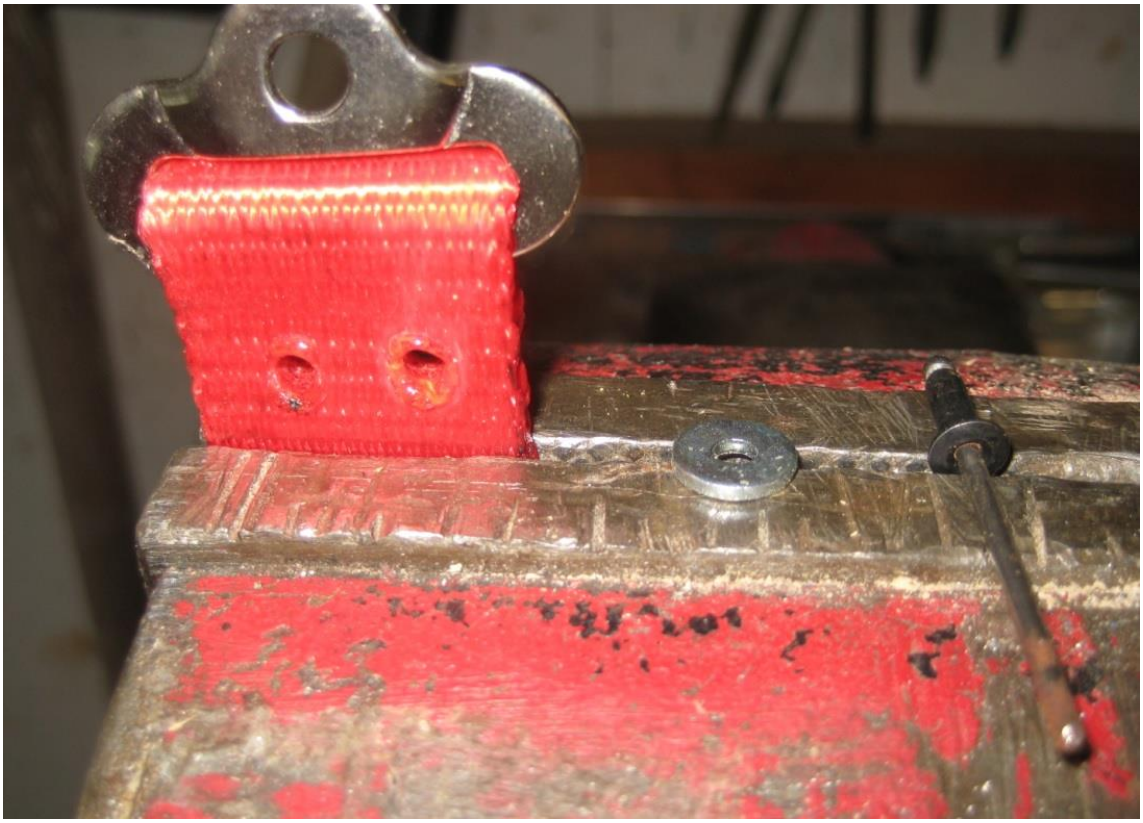


Metal chin strap connection to helmet on each side of helmet must be relocated 2" lower and forward as shown so metal chin strap connection and chin strap will not be under earmuff.

I used some 1" wide red nylon strap to replace original Shoei 1" black nylon strap that came with the helmet because I accidently cut black strap too short when shortening black original strap.

Method of shortening chin straps

Chin strap must be shortened 2" on each side by shortening chin strap connection to metal connector to the helmet.

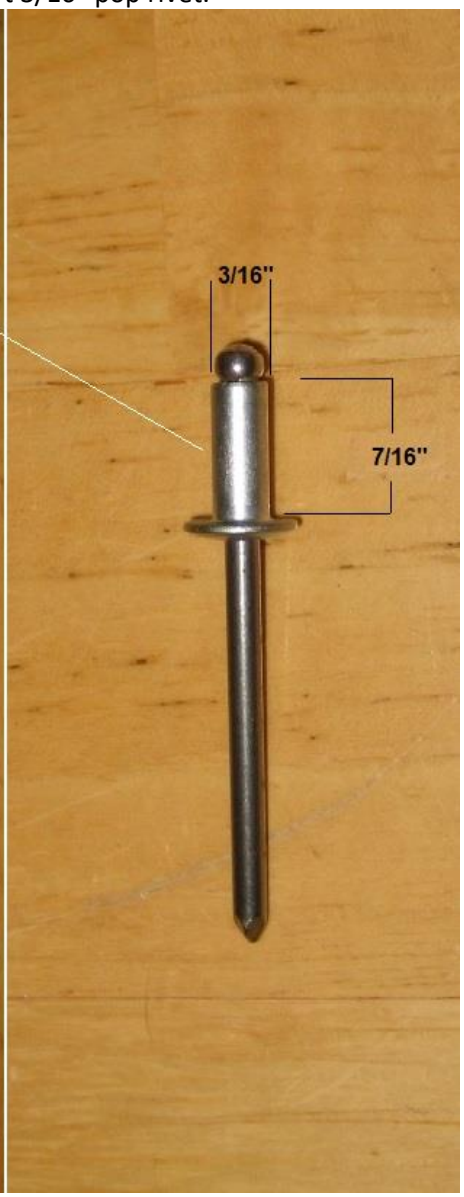


To attach 1" wide strap securely to metal strap attachment to helmet I held the strap in a vice and melted 1/8th holes thru strap using a torch to heating up a small nail. I found some very small 1/8th by 3/8th in length metal pop rivets to secure shortened strap to metal connector.

The picture below shows melted 1/8th hole thru nylon shortened chin strap for reinstallation of metal chin strap connection piece to be installed in new 3/16th inch hole drilled in the helmet for attaching metal chin strap connector.

Pop rivet gun

Pictures of shortened chin straps by 2" to compensate for relocation of metal chin strap connections t 2" lower and forward on each side of helmet. Reattach metal chin strap connectors using short 3/16" pop rivet.



An earmuff pocket must be cut out of Styrofoam insert on left and right side of helmet to accept earmuff.

The picture below a slot cut in side padding for air to flow from air pump to air bladder.

A thin piece of plastic was placed over slider mechanism for sun shield to protect mechanism and loop Velcro that comes in kit is stuck in proper location to inside earmuff pocket.

Plumbing parts to install in a helmet design to apply air pressure to earmuffs forcing earmuffs to seal around ears.

The picture above and below shows airline from each air bladder going under Styrofoam side padding and under side foam padding when they are installed on each side of helmet and connect to air pump at back of helmet.

The picture above shows location of air lines from air bladders to air valve and air bladder pump.

This pictures shows two small cable clamps that hold air valve pump with airlines attached securely in place on back of helmet. The cable clamps are stuck to the helmet with 3M VHB 5 lb. outdoor tape.

This picture shows Styrofoam side padding reinstalled in helmet

Foam padding reinstalled and all cable clamps holding air valve and air pump bladder securely to the helmet

Squeezing the air pump bladder repeatedly will forced into air bladders between back side of earmuffs and inside of helmet shell forcing the earmuffs to seal around ears. To release air pressure in air bladders push down on the pressure release valve.

Testing noise reduction at various speeds was performed by riding a 250 Yamaha Virago shown below at various speeds using sound level meter with remote control installed in the Quiet Ride passive noise reduction earmuff installed in the Shoei Neotec Modular helmet.

This is a picture of a quality sound level meter with remote lapel mic that is installed in helmets to measure sound levels at ears.

The small lapel mic is installed in earmuff to measuring sound levels in earmuff from 35 mph and 65 mph.

Test results for stock Shoei Neotec helmet before installing earmuffs and after installing noise reduction earmuffs

Cruising speed	1. Sound level in stock Shoei Neotec helmet with remote mic from sound level meter placed across from ear in the helmet.	2. Sound level in earmuff with remote mic installed in noise reduction earmuff in Shoei Neotec Helmet.
35 mph	91 dB	80 dB
45 mph	94 dB	82 dB
55 mph	98 dB	84 dB
60 mph	99 dB	86 dB
65 mph	100 dB	88 dB

Test results show an average noise reduction for wind and stock engine noise of 12 decibels (dB). For every 10 dB of noise reduction your ears perceive a sound level reduction of 50%, hence the noise reduction is just over 50%.

World Health Organization

Noise Dose Chart: Noise Exposure Limits

The risk to your hearing from noise exposure depends on how loud it is and how long you're exposed to it. This noise dose chart shows the acceptable safety limits.

Noise Dose Formula

The generally accepted standard to minimize hearing risk is based on an exposure to 85 dB for a maximum limit of eight hours per day, followed by at least ten hours of recovery time at 70 dB or lower (at which the risk of harm to healthy ears is negligible). Then a "3-dB exchange rate" formula is applied, which means that for every 3 dB above 85 dB, the maximum exposure time is cut in half.

Maximum Recommended Noise Dose Exposure Levels

Noise Level (dBA)	Maximum Exposure Time per 24 Hours
85	8 hours
88	4 hours
91	2 hours
94	1 hour
97	30 minutes
100	15 minutes
103	7.5 minutes

Conclusion

After reading the noise exposure limits above provided by the World Health Organization riders should conclude they have three options to protect their hearing when riding for extended periods of time.

1. Wear quality earplugs to protect hearing
or
2. Wear a helmet with noise reduction earmuffs installed in their helmet
or
3. Wear earplugs and noise reduction earmuffs installed in their helmet

I have tested many full size helmets and modular helmets for sound levels at various speeds. Using the sound level meter shown above shows sound levels at various speeds for all manufacture helmet models without ear noise reduction earmuffs installed to produce very similar sound levels no matter the manufacturer.

SOUND LEVEL
METER
SL-4013