How to Design Wind Noise Resistant Microphone Ports

Microphones are sensitive devices that works best in calm environments. Due to this fact they are not naturally working well outdoors when exposed to wind and weather. Therefore, they need to be protected by design.

Intercoms are two-way-communication devices, usually placed at gates and doors outside, to keep unwanted people away. Since its function is to facilitate communication with the operating gatekeeper, good speech clarity is vital for good function. When the intercom is exposed of high winds, the microphone can be induced with a lot of wind noise that could hinder the communication between the people talking and decrease the safety through possible misunderstandings.

This thesis objective was to mitigate the wind noise in a microphone of an intercom through the design of the microphone port.

The port is the channel where air and acoustical waves travel through to reach the microphone that is located further inside of the product.

The method of developing port designs, that were able to successfully increase the speech clarity in wind, involved experimental testing of different port designs. Several different designs were developed through changing factors of the shape to understand which setpoints that gave the best results. The design methodology is called Robust Design.

The developed designs were then tested through the human-centered test method of speech-in-noise where people listened to audio clips of speech in wind produced by the thesis authors in an anechoic chamber.

What was concluded from the project was that large conical ports were able to produce the best speech intelligibility in wind. The conical port could be placed both in a front or down facing position, but when placed on the front a wind reducing add-on, as for example a metallic mesh, was recommended.

The designs worked well since they were able to create a calm environment for the microphone where less wind turbulence could interact with it.

The implementation of these designs on new intercom devices was believed to lead to higher safety and satisfaction for the costumer.

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