SOUND METER INDICATOR SIGN FOR DISASTER RESPONSE STRATEGY BASED ON VU METER

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Abstract:

Part of Indonesian island was connected directly with ocean. Apart of it is a coastal area where disaster-prone levels of waves from the sea need to get attention. Lately technology that is cheap and easily understood by ordinary people is to use indicators that are easily seen in each strategic location. Sound sensor which will be sent via Frequency Modulation is an effort to display the level of wave movement (ferocious / not), or high and low waves. The main purpose sound meter indicator sign for disaster response strategy based on vu meter is to get more information about a pre sign about wave disaster. located at tempursari lumajang district, this technology applied. for several trial, 70 % accuracy are accussed.

Key Words: Wave disaster, Frequensy Modulation, Indicator meter, Sensor, Engineering

JEL classification: O35

INTRODUCTION

The author is very interested to participate in thinking about disaster-prone problems and preventive programs made by BNPB (National Disaster Management Agency). Along with the development of technology in Indonesia, signal transmission can be done through many intermediaries and media, biased through Bluetooth, Wi-Fi radio frequency, and frequency modulation. It would be nice if the technology was very useful to help everyone especially the coastal area to find out how conditions the sea at the moment.

Tempursari is a district that is rich in fisheries and tourism. Because of its location close to the sea, Tempursari also did not escape being called the location of the "disaster prepared district". BNPB repeatedly provides conditions and training on disaster response that is not necessarily comprehensive. Technology development is demanded so that BNPB's strategy in responding to disasters reaches even ordinary people. Because of that wave height detection technology and delivered in the form of indicator indicators that are able to be seen by all communities become an answer not only for fishermen to go to sea or not but also for disaster response strategies.

The basic principle of AM and FM

In radio engineering we know various ways of modulation include amplitude modulation we know as AM modulation frequencies we know as FM and other modulation method is phase modulation. Radio we use daily to talk with colleagues HF SSB eg by air using air while the VHF AM modulation is commonly used two meter FM modulation.

In amplitude modulation (AM) sound vibrations we will ride on the carrier intangible pambawa wave amplitude changes from earlier in tune with kita. Sedangkan sound waves with frequency modulation (FM), the sound waves we will ride on a carrier wave frequency of the carrier wave and mengubahubah tune with kita. Rasanya audio vibrations can also be said that in AM, audio wave riding transversely on the FM audio while we ride longitudinally.

Transverse vibration is perpendicular to the longitudinal direction of the propagation medium is the same as the direction of propagation of vibration. Transceiver device that is widely available on the market and that we use today use these two kinds of modulation. Most aircraft using HF SSB modulation planes AM and VHF and UHF on the market, using FM modulation.

FM Transmitter

Allocated frequencies for FM broadcast is between 88-108 MHz, which in this frequency region is relatively free from interference either atmospheric or interference that is not expected

Standard FM broadcast channels occupy more than ten times the bandwidth (bandwidth) AM broadcasting channel. This is caused by the structure of more complex nonlinear sideband with their effects (deviation) to

require wider bandwidth than a simple linear distribution of sideband AM-sideband system. FM broadcasting band located on the VHF (Very High Frequency) frequency spectrum in which the available bandwidth that is wider than the length of medium wave (MW) on the AM broadcast band.

The purpose of the FM transmitter is to change one or more input signals in the form of audio frequency (AF) signals into a modulated waveform in the RF (Radio Frequency) is intended as a power output that is then fed to the antenna system to be transmitted. In the simplest form can be separated on the FM modulator and an RF power amplifier in a single unit. FM transmitters actually consists of a series of block subsystem has its own function, namely:

- a. FM exciter to change the audio signal into a frequency that has been modulated RF
- b. Intermediate Power Amplifier (IPA) is required on several transmitters to increase the RF power level to be able to handle the final stage
- c. Power Amplifier at the end increase the power of the signal as required by the antenna system
- d. The power supply (power supply) to change the input power source voltage and current AC into DC or AC required by each subsystem
- e. Transmitter Control System to monitor, protect and give the command for each subsystem so that they can work together and deliver results yangdiinginkan
- f. RF lowpass filter that does not limit the frequency of the transmitter output diinginkan
- g. Directional coupler which indicates that power is being sent to or received from the antenna system

FM receiver

FM receiver has the same concept with the AM to see more clearly the principles of the FM receiver can be explained sebagaiberikut:

Figure 1. FM Receiver block diagram

a) RF amplifier

The point is to amplify very weak signals and to facilitate tuning the receiver front end system here is used Band Pass Filter and increasing the amplitude of an RF signal.

b) Mixer

Mixer is used to change the input signal from one frequency to another frequency as output. Sometimes called frequency-converter circuit. local oscillator (LO), a voltage-controlled-oscillator (VCO), which generates a continuous wave. Mixer output form of two signal includes frequency LO and RF input signal, and having two outputs derived from the sum frequency ($\text{RF freq} + \text{LO freq}$) and subtraction ($\text{LO freq} - \text{freq RF}$).

c) Local Oscillator

Local oscillator is basically an RF carrier generator. The increase included in the LO wave voltage. The voltage causes a change in the frequency of the LO. Frequency oscillator to change the frequency band of the input signal and then convert it into an IF frequency. Resolution of the carrier frequency can be set up to 100 kHz

d) BPF (Band Pass Filter)

Electronic circuits that transmit signals within the limits of the frequency range, but can weaken the signal above or below the range of the frekuensi.

e) IF amplifier

Experienced a reduction in signal strength during the mixing process, the signal needs to be reinforced by the IF to restore the sensitivity of the receiver.

f) Limiter

Limiter can be interpreted as a frequency discriminator is applied in the system frequency setting otomatis. Limiter is a circuit that passes the signal if the power in accordance with the specifications of the power input, changes when a powerful signal attenuation peaks exceeding the input power for the results of the IF frequency is a high frequency raises amplifier amplitude change to keep the amplitude remains constant. It is needed to make a limiter on AM and FM receiver.

g) Detects Slope

The signal from the limiter on the filter by using slope detection of the signal to move closer to the original signal so that the audio signal is then passed to the speaker so we can hear the sound in detail.

RF amplifier: AM broadcast receiver can work quite well even without RF amplifier. It is difficult for the FM system works at high frequencies. As we all know there are FM system that works at 1000 MHz (1GHz). With the RF amplifier is the FM system can work in the input signal is lower than AM or SSB system, because the AM and SSB system does not or rarely use

RF amplifier because they can suppress the inherent noise. In other words, the FM system can work with a higher sensitivity of the system AM and SSB system. FM system can receive signals of 1 μV or less when compared to AM and SSB system with a minimum of input signal 30 μV . But if you want to signal 1 μV is fed directly into the mixer, the high inherent noise generated by the active component of the mixer will damage the input signal is 1 μV earlier. Therefore it is very important to strengthen the signal 1 μV so that it becomes 10-20 μV before being fed into the mixer. That is why it takes the RF amplifier on FM systems.

Reasons are found above is very important to note for the FM system that works above 1GHz. At these frequencies, the internal noise of the transistors rises when the gain is lowered. This noise is much lower when used as a passive mixer diode compared to the active transistor.

Indeed, the use of RF amplifier lowers the impact frequency of shadows and reduce the influence of local oscillator radiation effects to the antenna resulting in less interference.

VU Meter

An audio signal conversion into the form of a form

Figure 2. VU Meter Cidcuit

Sketch and plan

Diagram concept

In the manufacture inovasi sensor technology is based on the concept of sound waves The following diagram:

Figure 3. Concept block diagram

The Principle

1. The sound of the sound waves is measured by using a sound meter, to determine the location and position of the microphone
2. Soundmeter calibration is determined by several experiments to determine the db gain value from a wave of low, medium, and high
3. The laying of the tool is at the beach the 3 position may be necessary to obtain monitoring, such as TPI area, beach FUR, and Watu godheg
4. Locations tool is placed in a safe position of the noise (noise), and the antenna is sufficient.
5. Source voltage using "accumulator", where perawatannya every month
6. A signal from a transmitter in the form of "sound waves" of each beach is received by the FM receiver.
7. *receiver* FM is equipped VU Meter and level indicator lights can be put on other strategic locations and easily seen by everyone sepertidaerah intersection Tempursari field, Bulurejo and KarangMenjangan.
8. Determine the current FM frequency calibration to determine the sound that fits in every recipient.
9. Mengindikasikan indicator light if the current calm sea conditions or malignant, high or low.
10. And the final goal, everyone can know the situation of the waves just by looking at the indicator light.

B. Work Procedures

1. Design a simple circuit of FM transmitter, calibration and testing.
2. Installation and FM transmitter antennas at each individual location
3. Instalasi and Installation Level Indicator Lights Waves using VU Meter
4. Test and search frequency of each transmitter transmitter.

BOM (Bill of Material) and Design Cost

As for the design costs of the making of this technology are as follows :

NO	Name Tools and Materials	Specification	amount	unit	Price per unit	Total price
1	Mini FM transmitter	5 W / more	3	Fruit	40,000	120,000
2	FM receiver	Small	3	Fruit	30,000	90,000
3	antenna tool	yagi	3	Fruit	60,000	180,000
4	VU Meter	10 levels	3	Fruit	50,000	150.000
5	driver Lights	air conditioning	3	Fruit	30,000	90,000
6	Etc	-	-	-	-	300,000
Total						930,000

So the total expenditure for the manufacture of Wave Level Indicator is Rp. 930,000 / 3 locations and for other materials, there may be more than a total of 83\$.

Finding and discussion

Lately technology that is cheap and easily understood by ordinary people is to use indicators that are easily seen in each strategic location. Sound sensor which will be sent via Frequency Modulation is an effort to display the level of wave movement (ferocious / not), or high and low waves. The main purpose sound meter indicator sign for disaster response strategy based on vu meter is to get more information about a pre sign about wave disaster. located at tempursari lumajang district, this technology applied. for several trial, 70 % accuration are accussed.

In the future needed to improve the quality of calibration to provide a performance or an interesting view on Level Indicator Light Sound Waves. It is expected that the indicator lights are not only installed on three strategic points but attached at each location where BNPB strategy in conducting preventive action disaster preparedness goes well.

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