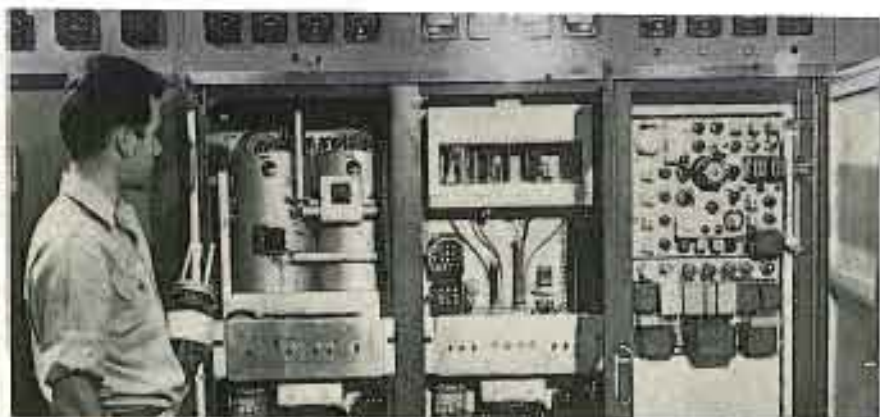


Super Power FM (349 Kw)



At the controls of WTMJ-FM (left to right): Phillip B. Lasser, chief engineer of WTMJ-FM and WTMJ-TV facilities and W. B. Fletcher, RCA Service Corp. engineer.

WTMJ-FM engineer, Raymond Herodoy, with a 7C24 which is used in the 10-kw stage at the left and also in 3-kw and 1-kw stages as shown in center rack. The modulator is in the right transmitter rack.



The power control and circuit breaker panel of the FM transmitter. Unit is adjacent to the 50-kw amplifier units.



THE FAMOUS MILWAUKEE FM station which went on the air nearly nine years ago, with the call letters W55M, and today is one of the nation's most powerful FM operators, radiating 349 kw, employs many unique transmitting plant¹ and antenna² facilities.

Antenna System

The antenna system, located some one thousand feet in elevation above the city of Milwaukee, features an eight-element antenna located on top of a 550' tower³ providing a 25,000 to 30,000 microvolt signal.

The antenna system is fed by two 3 $\frac{1}{8}$ " coax transmission lines using flange couplers. The antenna is split using one transmission line to feed the top 4 elements and the remaining line to feed the bottom four elements. Phasing between the two groups of antennas is accomplished in the transmitter room. With this dual transmission line system failure in one of the antennas or transmission line sections cannot disrupt radiation, since it is possible to cut out the defective section and continue transmission on the remaining one-half of the system at one-half transmitter power.

Power Amplifiers

The transmitter building, a two-floor brick building, is located about 130' from the base of the tower.

The transmitter has three power amplifiers which provide 50 kw. To obtain this power, two 25-kw amplifiers and one 20-kw driver amplifier are used in grounded grid circuits. A considerable amount of generated power is fed through the amplifier from each of the preceding driver stages. This is reflected in the output circuits as an apparent increase in the overall efficiency of the amplifier. In the instance of the two final 25-kw amplifiers, which are coupled together to feed the antenna, the efficiency factor under normal grid drive conditions for 50-kw operation is 85 per cent.

Antenna Power Controls

A feature of the transmitter is the power cut back switch allowing instantaneous transfer of the antenna to the 10-kw stage. This operation thereby removes all power from the 50-kw circuits leaving the equipment safe for the personnel to service in the event of equipment failure. Another feature of the transmitter is the reflectometer which is mounted on the transmission line leading to the antenna. This instrument measures the relative power output of the transmitter and also indicates the degree of the reflected energy from the antenna system. In the event of an antenna or transmission line failure causing the reflected energy to increase beyond a predetermined set safe value, the re-

¹ RCA BTP-50A. ² RCA. ³ Blaw-Knox.
⁴ General Radio 804 B.

At WTMJ-FM

rectometer in connection with its associated equipment will immediately cut off the transmitter power, thereby safeguarding and protecting the antenna system from burnout.

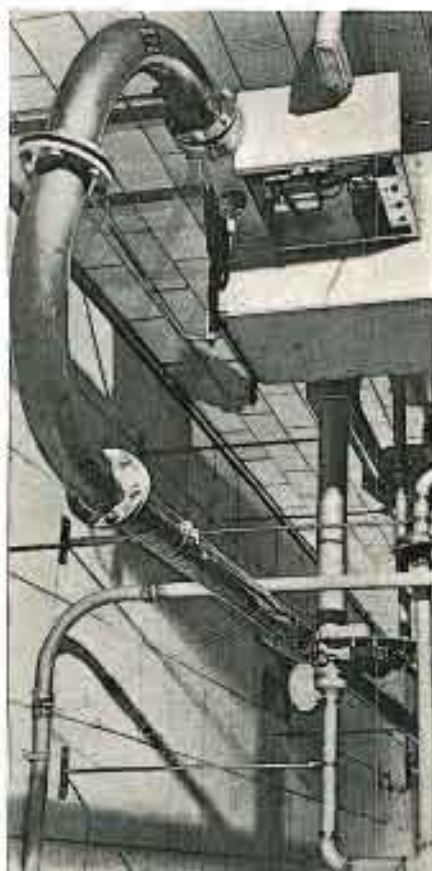
Noise Level Measurements

Measurements taken on the transmitter have indicated that the AM noise level runs better than 52 db and the FM noise level better than 65 db which includes studio and a twenty-six mile circuit of the Wisconsin Bell Telephone Company program line.

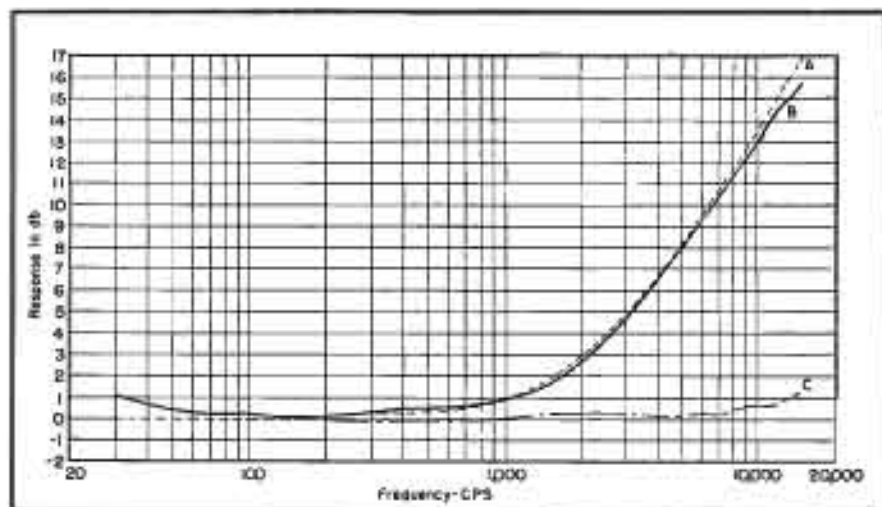
Harmonic Checks

Harmonic checks have indicated that the second harmonic content at 186.6 mc measured one-half mile from the transmitter and compared to a standard signal generator, was found to correspond to 120 microvolts, a value considered not to be objectionable to other services.

The harmonic filter, transmission line monitor, and coax line to the 25-kw amplifier and output to the antenna system. Also shown are the outback switches and wiring ducts.



A. B. Van Alstyne, WTMJ transmitter supervisor, using a tube hoist to remove one of the 6592 power amplifier tubes.



Audio frequency response at 100% modulation on a G.E. BM1A modulation meter (without de-emphasis) from the input of transmitter speech amplifier to output of transmitter. B represents the audio-frequency response curve (shifted to 1000 cps reference and inverted); A is the standard preamp curve, and C is the standard preamp curve subtracted from the measured audio response curve.

Measurements made from input of transmitter speech amplifier to output of transmitter. All measurements made with a GR 1932-A distortion meter and a limiting amplifier. Curve at A is at 100% modulation; B, 50% modulation and C, 25% modulation.

