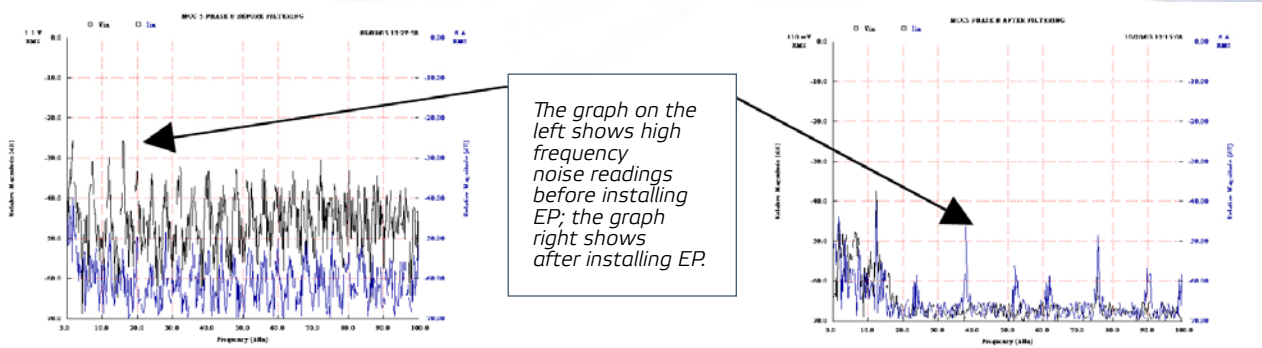




Improving Motor Efficiency, Star of the West Milling—Frankenmuth Michigan

Facilities use motors in nearly every step of the production process. Motors power conveyor systems, compressors and robotics. Most modern facilities rely on variable frequency drives to control the speed and output of motors. High frequency noise generated by non-linear loads, such as variable frequency drives, distort the electrical waveform delivered to motors and this results in slip losses. These slip losses decrease the efficiency and lifespan of motors.

Examine the case of Star of the West Milling located in Frankenmuth, MI. The facility was plagued with both voltage and current high frequency noise between 3kHz-1.5MHz. This level of noise is significant enough to cause slip losses.



An EP-2500 was installed on the main panel. EP-2000's were installed on downstream panels and on the motor control center. Since there were considerable electronics in this facility, an EP-2750 ground filter was installed to assist with removing high frequency noise from the grounding grid.

Star of the West Flour Mill Motor Report

Motor #	Description	HP	Load HP	Current CF	Voltage CF	Power factor	Slip	Energy Saved
655	Airlock	1	0.28	50%	50%	0	0	0
649	Tempe bin auger	2	0.39	0	60%	0	82%	3 watts/hp
702	Blower	20	10.73	0	13%	0	45%	1watt/lb-in
1006	BLower	40	28.5	0	33%	18%	0	0
10007	1st br. Mill	40	19	1%	85%	10%	75%	1 watt/hp
632	Carter Disc	3	1.94	50%	9%	2%	0	1 watt/hp
706	Tumbler	25	6.07	15%	9%	0	33%	1 watt/hp
709	Intensive Damp	15	12	93%	86%	0	23%	1 watt/hp
616	Fan	30	24	0	25%	0	0	1 watt/hp
712	Hammemill	30	15	0%	81%	33%	86%	1 watt/hp
507	Fan	60	49	5%	25%	2%	0	1 watt/hp
209	Vibrator Duster	7.5	4.9	0	11%	0	41%	0
711	Scourer	25	9	0	0	5%	0	1 watt/hp
636	Heids	5	2.5	0	0	0	0	0
232	Sweeper	25	20	16%	30%	0	0	0
S. Line Shaft		75	72.56	10%	5%	0	0	0

Percent Values are the Percent improvements in motor efficiency after filtering

Star of the West invested \$70,000.00 to fully install the EP system. The facility produced 6,297,726 bushels annually. By improving the efficiency of the system and the motors, the EP system saved \$.00674122 per bushel. This translates into a savings of \$42,454.34 annually. The return on investment for this project was 1.65 years.

The percentages represent improvement. Column eight represents the percentage of improvement of slip efficiency of the motors; motor number 649 improved by 82 percent. That translates into a 3 watt per horse power of energy loss reduction per hour.