IMPACT OF DC DRIVE HARMONICS ON PRESS PERFORMANCE AND PFC CAPACITORS - DETUNED PASSIVE HARMONIC FILTER SYSTEMS

PRINTING PRESS

PREAMBLE

The plant is a printing Press, which is incorporated with DC Drives as the major Load. The operation is not continuous and whenever the printing process is ON, the press unit was reported to malfunction and the power factor correction capacitors fail frequently.

SITE ANALYSIS AND OBSERVATIONS

Parameters	Readings
KVA	226
kW	151
kVAR	168
Current	326
PF	0.67
THD Voltage Harmonics	6.36
THD Current Harmonics	26

The analysis of the readings recorded during the time of measurement shows that the instantaneous PF of 0.67 is less due to major DC Drive load.

The Voltage THD recorded of 6.36% and Current THD of 26% are high exceeding the Standards for Harmonics.

The load is high when Printing Process is on, during which the Reactive Power requirement and Harmonic Distortion level are high. Otherwise only base Loads are to be compensated.

INFERENCE

The root cause for the malfunctioning of Press Unit and the frequent failure of PF Correction Capacitors are due to high level of Harmonic Distortion.

SYSTEM DESIGN AND RECOMMENDATION

Basic necessity of the system is identified as:

1. Current harmonic suppression.
2. Voltage thd reduction.
3. Variable Reactive Power Compensation

Hence an Auto Switched Detuned Harmonic Filter System was recommended to be installed at the LV side of the Transformer at the Main incomer. The Performance is as explained below.

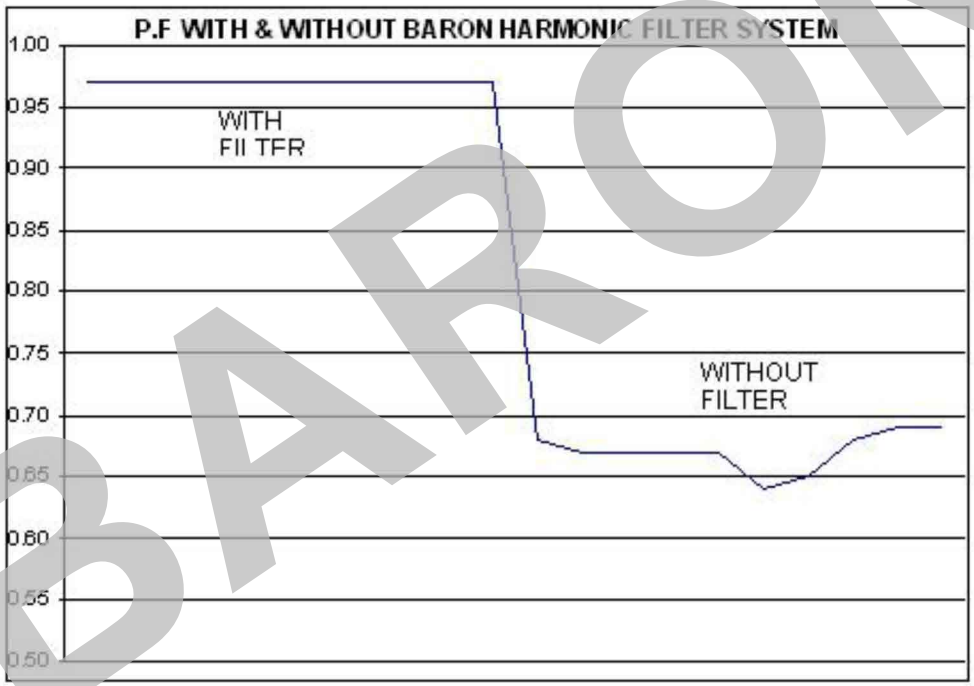
COMMITTED PERFORMNACE

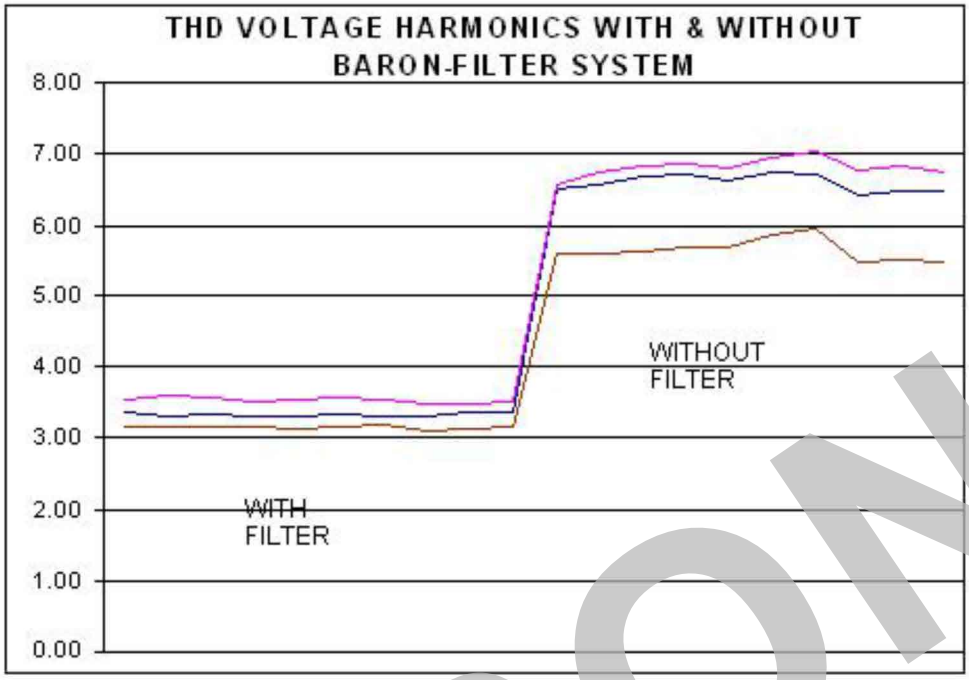
Parameters	Commitment
KVA Reduction	54 KVA
Current Reduction	76 Amps
PF	0.95
THD Voltage Harmonics	5%
THD Current Harmonics	15%

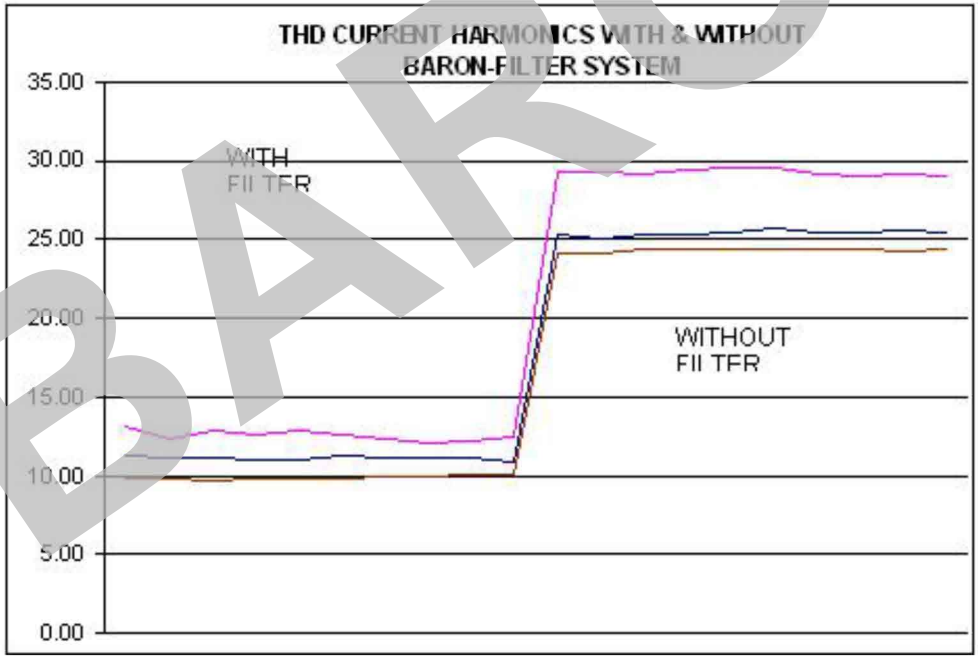
ACTUAL PERFORMANCE

Parameters	Actual Performance
KVA Reduction	56 KVA
Current Reduction with Filter	76 Amps

PF	0.97
THD Voltage Harmonics	3.35%
THD Current Harmonics	11%







With the implementation of the Harmonic Filter System, the THD Voltage level has come down to 3.35 % against the committed value of 5 %, and the THD Current level has come down to 11% against 15 % Committed. This reduction in Harmonic Distortion level has avoided the Malfunctioning of the Press unit and frequent Failure of PF Correction Capacitors. Further, the Apparent Current has reduced through 76 A and the kVA reduction of 56 kVA was achieved with the Filter System, which has direct benefits of cost saving in EB Bill.