PLAINLY SPEAKING ABOUT HARMONIC PENALTY, THD and POWER QUALITY ISSUES

in our TEXTILE SPINNING MILLS in TAMIL NADU – February 2020.

The THD problem in the textile spinning mills in Tamil Nadu is to be addressed by the mill immediately as Safety & KVA saving precaution now before the EB authority enforces the Harmonic Penalty law from now. For which the Textile Associations have to make ends meet, by collecting the data from the mills who had implemented already and sort out the issue immediately to address the issue & reduce the KVA losses in mills..

POINTER TO EB HARMONICS PENALTY:-

The EB had already enforced the Harmonics in the all the other industry segments in most of their HT consumer segment and many of them have implemented. But the EB have to grade the Harmonics penalty, like what had already done for the PF decades back. Also they have to educate the industry to keep the THD values within norms and arrest the mill's harmonics within their premises and not to spill out. At least this time, they have to formulate to put Graded Penalty for the industry Deviation THD A % from the Enforced Norms.

POINTER TO THE TEXTILE MILLS:-

OUR mill Electrical is very much aware that how the harmonics is generated from the mill equipments.

1. Textile mill electrical loading pattern is like that most of mills don't need Active Harmonic Filter. To start with, Load end PF compensation for non-VFD motors, Line reactance choke for VFD motors, De-tuned RCC bank at SSB and Power house feeding to VFD loads mixture, if required. This will bring down your THD A to the minimum possible. If majority of the mill load are non-linear, there only the need for AHF arises.
2. First provide Multi function meter at the secondary of your transformer at Power HOuse and measure the Harmonics from your mill, and keep two sets of THD alarm to alert you, when THD raises to THD set values.
3. Pls confirm THD V is within EB norms when the mill secondary loads is totally off, and if not there, report this to EB by mail and letter along with snapshots of the meter readings. They have to correct this THD –V part.
4. If the THD A is above the EB norms, then it is generated from our mill and keep record of the same with audio visual alarm to alert you, and if possible provide link to computer for trend recording. This is better.
5. Have you corrected all your Linear loads, say motors above 5 HP by load end PF compensation? DO NOW.
6. Have you installed Harmonic Reduction Line chokes to all your VFD in all machines above 5 HP? DO NOW.
7. Have you implemented pucca earthing say like chemical bonded earthing / maintenance free earthing, this is not only needed for Harmonic suppression, but this also ensures the mill electrical safety. DO NOW.
8. Check all your capacitors for their basic parameter as charging current. Also check by power parameters when your capacitor is Tee connected to motors, the same is functioning in & out? CHECK TODAY.
9. Isolate and remove any capacitors at your VFD incoming SSB as they will amplify Harmonics. CONFIRM NOW
10. When installing Line Reactance choke to all your VFD, confirm before and after how much THD reduced?
11. In the Power house, if you have APFC, convert the same to act on RCC bank instead of only cap bank. Keep your APFC capacity to the minimum possible to suit to your requirements, and always have 3 CT based APFC.
12. Provided you have 10 % breathing KVA in your sanctioned KVA demand, it is better to keep around 0.97 to 0.98 values and don't' need to add many excess capacitor banks to maintain unity power factor.
13. It is better to run the mill with safe PF value average than overdoing the capacitor additions and land up in leading KVARH situation and leading PF, excess Harmonics and fluctuating leading voltages can be avoided.
14. See that your VFD is maintaining minimum THD A from your production machines. Some utility machines VFD are pumping in more THD A than the other branded VFD machines, to monitor & consult with OEM.

15. Always when you procure, insist of Harmonic Compliance at the purchase stage itself and ask the OEM what the THD A band at their machine's loading stage say at ¼, ½. ¾ and full load and for the working KW band?
16. Good VFD will always maintain PF around 0.90 at any loading level say from 30 to 90 %, confirm your VFD always tries to maintain higher PF and lower THD Amps as recommended by your machine / VFD vendor?

POINTER TO MACHINE & VFD OEM:-

1. When you supply your machine or VFD, please ensure Harmonic compliance values of your m/c to the mill.
2. When mills can install VFD near the main motor, this Load end PF capacitor for non-VFD machine, Line Reactance choke for VFD machine also can be installed, so provide provision inside to install the same.
3. For your VFD, please don't' compromise and give only 1 % Surge suppression input filter, or DC link choke. Provide AC input Harmonic Filter cum Line choke so that this choke reduces THD A& arrests Harmonics here.
4. Ensure your machine VFD is kept cool by heavy duty exhaust fan, hot exhaust air is ducted from VFD to out.
5. Your VFD panel, Line choke panel to maintain good air circulation inside panel, being in textile mill humid dusty fluff environment. So that the VFD does not fail due to thermal overloading and electrical overload.
6. In case, the VFD is away from the motor by many meters, suggest the mill to add Load Reactance choke.

POINTER TO TEXTILE ASSOCIATION:-

The association is functioning to address the genuine grievances of the mills by collective projection. But here it is energy loss by way of KWH & KVAH when THD is not reduced now. It is the cushion period given by EB for the past one year to correct the mill THD by itself. This back-throwing THD Amps from the mill to EB grid is not rational, not safe for the mill and not as per the EB PQ norms.

So the Association has to bridge the gap and expedite the mills to take precautions, to curb the Harmonics. If some MNC is there in our textile mill segment, first they will strictly adhere to local EB body norms only. Also many textile group mills have understood this KVA loss, and already adhered the EB norms years back. Please get merits of their exercise and share to other mills to prompt them to curb their THD.

Association is asking the mills now to adopt to wait and watch mode to arrest their Harmonics. This will invite the EB later to put heavy penalty cum interest retrospectively, this will burden the mill at later stage.

Had it been KVAH billing, the mills would have implemented this. Some group mills report there is reduction in their KVA demand after putting Harmonic filters. So let us not stand between and delay the preventive measure already planned by each mill. Let us prompt today to expedite their THD issue as per EB norms.

CONCLUSION:-

Having done energy audits in more than few hundreds and especially mostly in textile mill segment, In My Humble Opinion, I am sharing this un-biased view. I am not here to promote the product or process here, but observing the visible loss in KW, KVA due to non-implementation of Harmonic Mitigation by mills. The above content is not to offend any mill, or Association or favoring EB enforcement. But we all have to work together and proactively to curb the Harmonics at our Source, this strengthens EB distribution from the sub-station to all the feeders including our mill, reduce the EB HT Line Losses, and the mills can contribute towards reduction of National Electrical T & D losses, apart from our saving in our monthly EB bills.

Leave alone the Harmonic reduction by mills to adhere to EB norms, we find, 7 out of 10 mills have not still done the Load End PF compensation for majority of their motors. They have done this PF improvements upto the SSB only. Already the Electrical Line loss is visible and let us not further add Electrical Distribution Losses by Excess capacitors in Power House that is feeding to VFD loads now. Draw a line now to De-markate to PF compensate at motor ends, and to retrofit Harmonic Reduction choke at all VFD loads Today.

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