Desizing Effluent Treatment
Recycle of Textile Desizing Effluents

Lecture 12
DESIZING EFFLUENT TREATMENT

The relative contribution of the desizing effluent to the pollution load of a textile mill (name withheld) is given in Table. In this case, the desizing effluent contributed over 55% of the COD and over 40% of the total solids of the wet preparation section. On a mill basis, the COD was 20% and the total solids 11% of the total. In general, it is expected that the desizing effluent will contribute 15-40% of the mill pollution load depending on the type of sizing agents in use and the relative contributions of other textile processes (e.g. Dyeing, printing).
The various methods that have been proposed for the reduction of the pollution load or treatment of desizing effluents are:

(i) Solvent sizing

(ii) Hot melt sizing

(iii) Substitution of sizing agents

(iv) Precipitation of the size in the effluent

(v) Biological treatment of desizing effluent

(vi) Plasma discharge desizing

(vii) High expression washing

(viii) Size recovery by ultrafiltration or hyperfiltration.
Solvent Sizing

In solvent sizing or desizing, water is replaced by an organic solvent such as tetrachloroethylene (TCE). The desizing effluent is concentrated by distillation and the size is reused. The advantage of using an organic solvent in preference to an aqueous system is in the lower boiling point and latent heat of vapourisation of the solvent.
Conventional sizing agents

- Conventional sizing agents cannot be used and modified cellulosic sizes are applied either as aqueous or TCE solution and subsequently desized with TCE.

- The desizing effluent is evaporated and reused to save the cost as shown in Table. The cost of the system is less if aqueous sizing is undertaken as it does not require vapour recovery system.
Hot Melt Sizing

Fabrics woven from warps which have been hot melt sized have to be desized using either water or solvents and the effluent produced would have to be treated in a manner similar to conventional desizing effluent.
Substitution of Sizing Agents

Sizing chemicals can be selected on the basis of their environmental pollution potential. The BOD and OA of the desizing effluent can be substantially decreased by substituting PVA, PAA or CMC for starch based sizes.

In India, the COD is preferred as the main pollution parameter, and in this case starch based sizes compare favorably with the synthetic polymer sizes. Size substitution becomes necessary if size reuse is to be done because the recovered size must not be degraded between the initial sizing and subsequent reuse.
Precipitation of the Size

Precipitation has been used as a method for recovering CMC. Precipitation of the CMC occurred if aluminium sulphate (alum) is added to the desizing effluent. The precipitate is dewatered to a 10 to 15% slurry and treated with sodium hydroxide to dissolve the CMC which may then be recycled to sizing.

A large proportion of the COD (70 to 80%) was found to remain in the supernatant after precipitation. The recovered size had to be stored hot to prevent biodegradation of the CMC, and prolonged heating resulted in a decrease in solution viscosity which causes problem in obtaining reproducible sizing conditions.