Structural Health Monitoring (SHM)
Prof. Srinivasan Chandrasekaran
Department of Ocean Engineering
Indian Institute of Technology, Madras

Lecture – 24
Part 2: Structural Health Monitoring (SHM) Planning and Management

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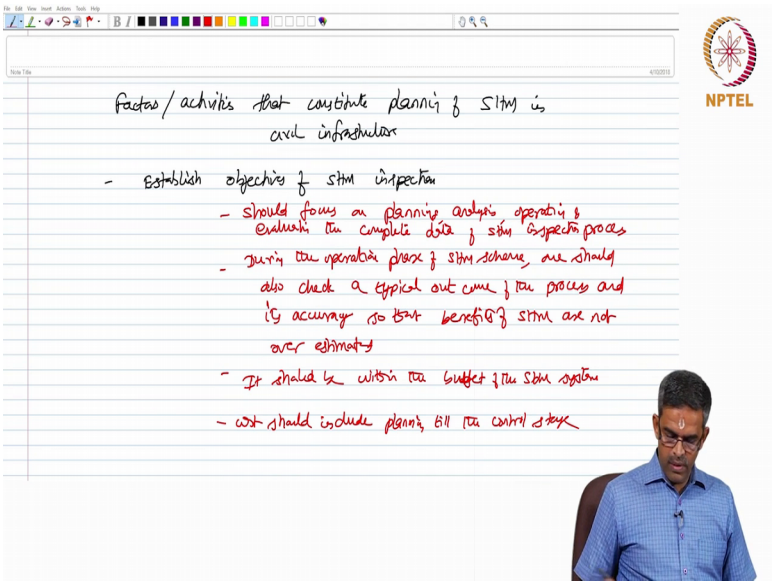

Keeping this in mind let us now consider what are the factors or activities that constitute planning process of structural health monitoring in civil infrastructure the first activity will be let us try to establish the objectives of structural health monitoring inspection. I mean let us be very clear, why are we doing this inspection? It is very important that this should focus the inspection objective should focus on planning, analysis, operating and evaluating the complete data of a SHM inspection process.

During the operation phase of SHM structural health monitoring scheme one should also check a typical outcome of the scheme or of the process and its accuracy so that benefits of SHM are not overestimated further objectives should be within the budget of the SHM system. Cost should include planning up to the control stage.

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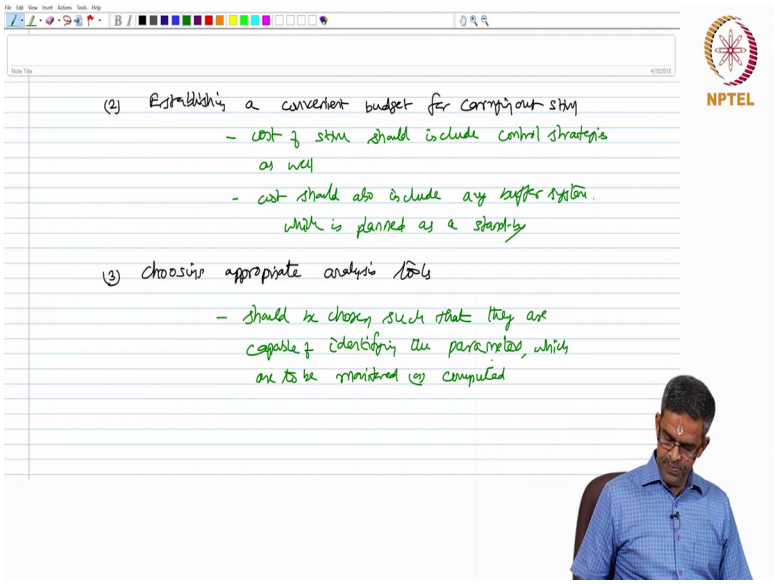

The second activity could be establishing a convenient budget for carrying out structural health monitoring. As I said the cost of a SHM should include control strategies as well. Cost should also include any buffer system which is planned as a standard. The third step or the third objective in a SHM planning is choosing appropriate analysis tools analysis tools should be chosen such that they are capable of identifying the parameters which are to be monitored or which are to be computed.

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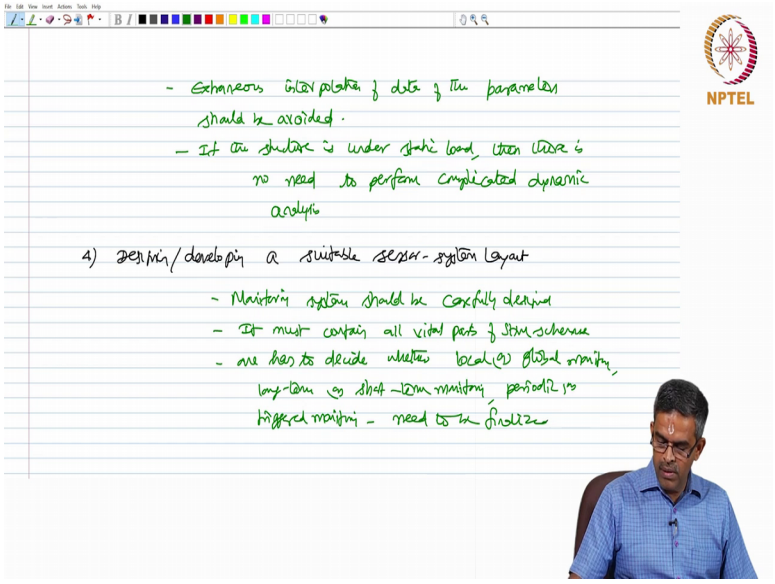

The extraneous interpolating interpolation of data of the parameters should be avoided; usually the analysis should be based on the accumulated or collected data and not on interpolated data. If the structure is in the static load then there is no need to perform complicated dynamic analysis the forth could be designing or developing a suitable sensor system layout.

Friends, monitoring system should be carefully designed. It must include all vital parts of health monitoring scheme. One has to decide whether local monitoring or global monitoring, long-term or short-term monitoring, whether we are going to go for periodic or triggered monitoring because the sensor system layout depends upon the type of monitoring to be done, this need to be finalized.

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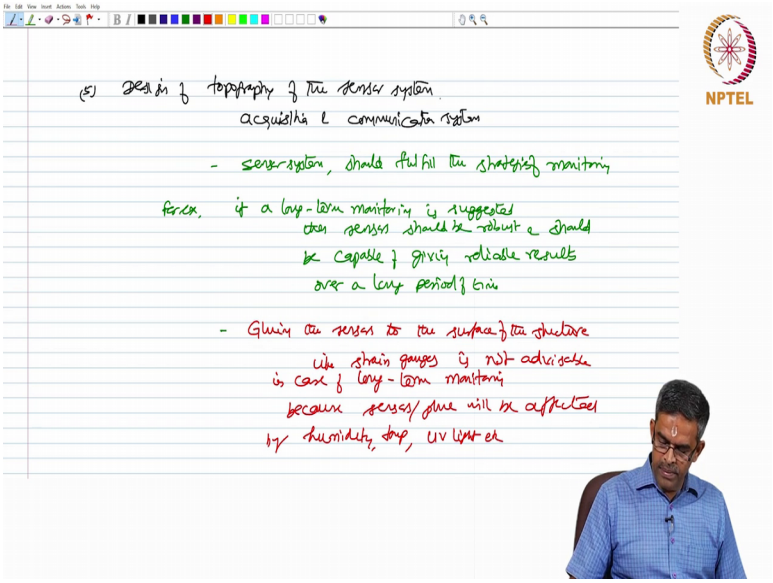

Further design of topography of the sensor system, acquisition system and communication system is also important in SHM planning. The sensor system designed and adopted should fulfill the strategies of monitoring. For example if a long-term monitoring is suggested then sensors should be robust and should be capable of giving reliable results over a long period of time.

A common problem is let us say gluing the sensors to the surface of the structure like strain gauges is not advisable in case of long-term monitoring because sensors and the glue will be affected by humidity, temperature, ultraviolet lighting etcetera.

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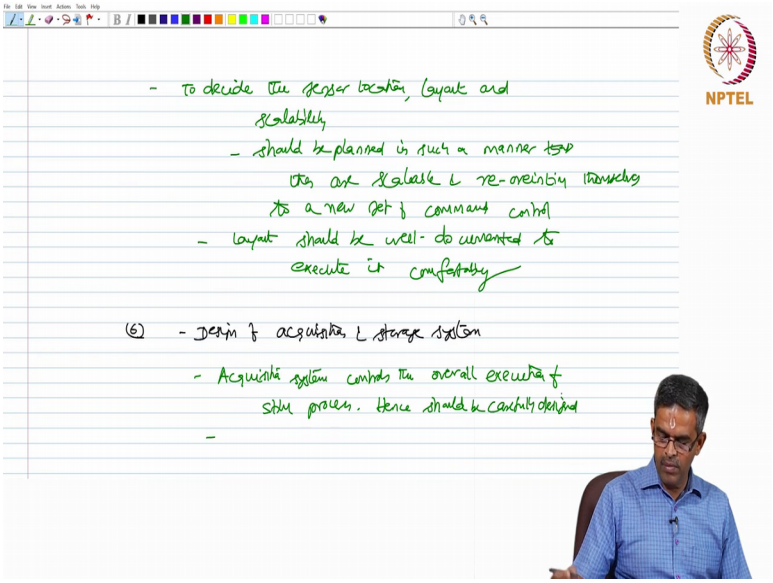

Further it is also important to decide the sensor location layout and scalability. Layout should be planned in such a manner that they are scalable and capable of re-orienting themselves to a new set of command control.

The whole layout should be well-documented to execute it comfortably. The next could be the design of acquisition and storage system that is another activity in SHM planning. Acquisition system actually controls the overall execution of structural health monitoring process and hence should be carefully designed.

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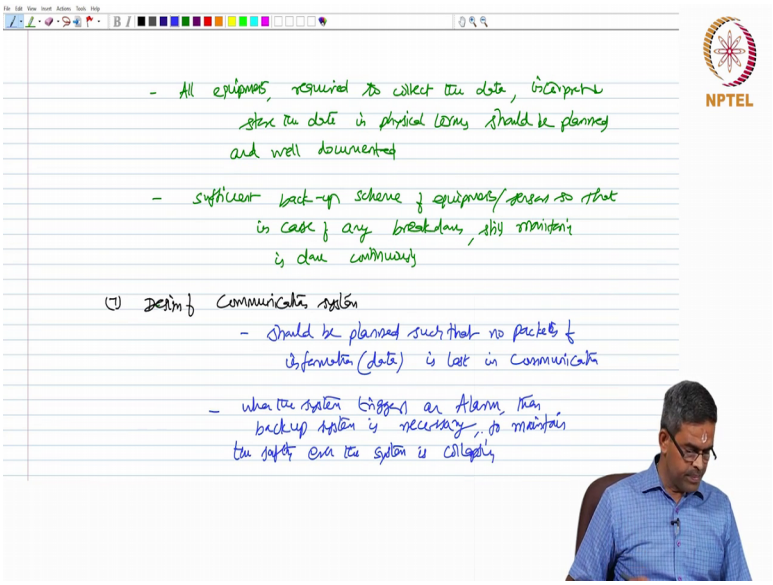

All the equipments require to collect the data interpret and store the data in physical terms it should be planned and well documented. One should also plan for sufficient backup scheme of equipments and sensors, so that in case of any background in case of any breakdown still monitoring is done continuously.

Design of communication systems they are very important and should be planned such that no packets of information or data is lost in communication. Especially when the system triggers an alarm then backup system is essentially necessary to maintain the safety even when the system is collapsing.

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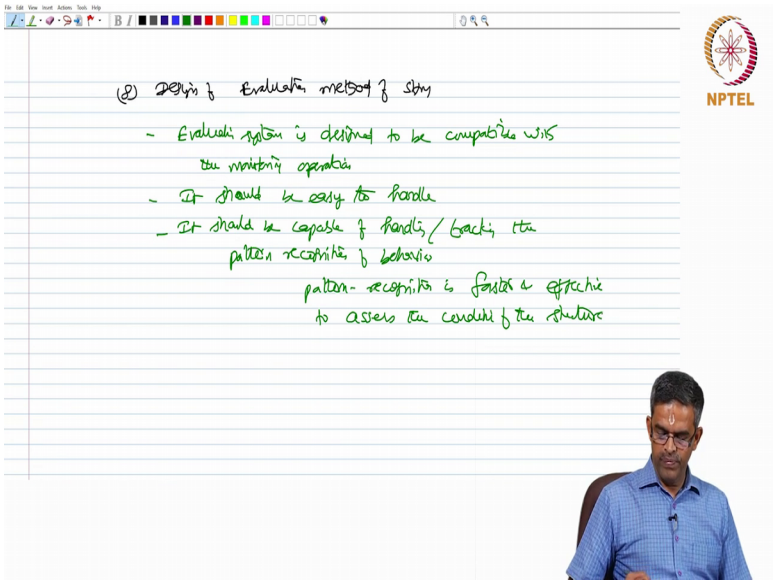

One should also take care of design of evaluation method of health monitoring evaluation system is designed in such a manner, so that it remains compatible with the monitoring operation. It should be easy to handle and install, it should be capable of handling or let us say tracking the pattern recognition of the behavior because pattern recognition is faster and effective to assess the condition of the structure.

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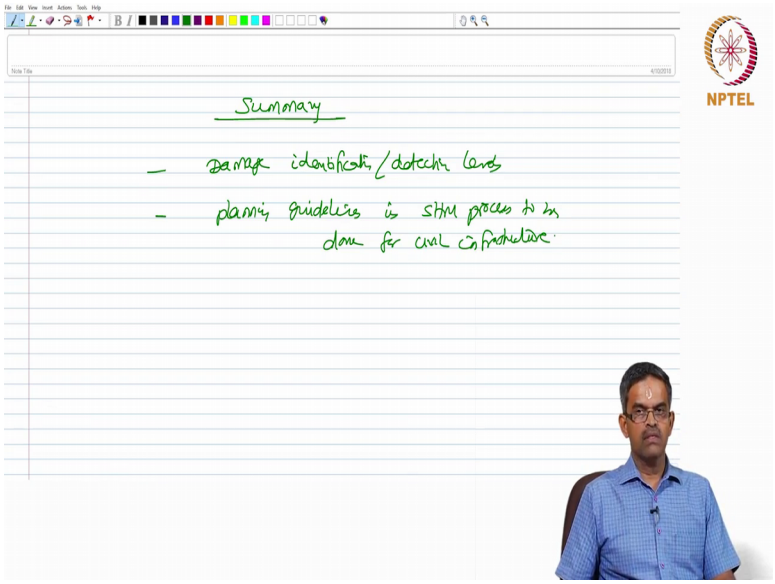

So, friends, in this lecture we learnt about the damage identification and detection levels. We also learnt about, what are the planning guidelines in case of structural health monitoring process to be done for civil infrastructure. We will see further more details in the coming lectures.

Thank you very much.