Software Project Management
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Lecture – 52
ISO 9000

Welcome to this lecture. In the last lecture we had looked at a quality system and it said that there are some popular quality systems. The guidelines for which I have been formed, one of that is ISO 9000 and another one is SEI CMM. These two we will discuss in some depth and then we will look at the personal software process and the six sigma concepts. Let us discuss about the ISO 9000.

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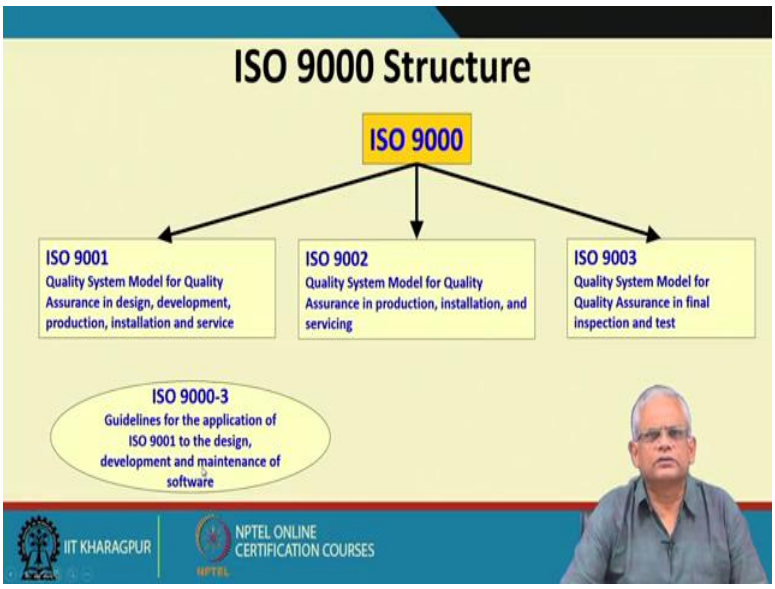

In the last lecture we had said that the ISO 9000 is a series of guidelines to set up a quality system, it came up with a series of volumes. ISO 9001, 9002 and 9003; initially came up with these three volumes in 1987. The ISO 9001 it discusses the guidelines for the quality system model, for quality assurance in design development product installation and service. This is a generic set of guidelines applicable to a wide spectrum of industry and including software industries.

ISO 9002 on the other hand it is a set of guidelines for setting up a quality system model, for quality assurance in production, installation and servicing. ISO 9003 is the quality system model for quality assurance and final inspection and test. But, then as we were

mentioning in the last lecture that the 9001 is applicable to a wide spectrum of industries and software is very different software industries working is very different from other industries.

And, there were difficulty in interpreting the ISO 9001 clauses for software industry; due to this purpose ISO came up with new volume, a new document the ISO 9003, part 3. This interprets the ISO 9001, the context of software industry is specific to the software industry, is guidelines for application of ISO 9001 to the design development and maintenance of software. Our discussions here will be formed on the ISO 9000 part 3 document.

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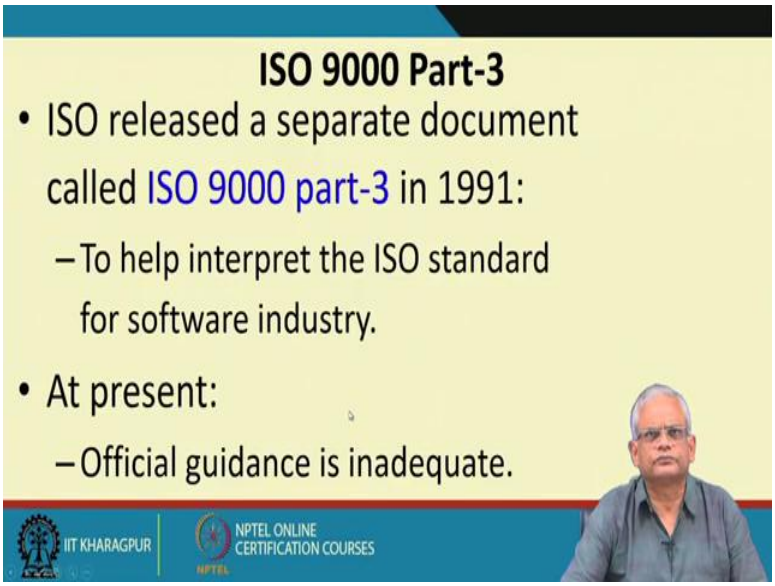

The ISO 9000 part 3 document, it interprets the ISO standard for software industry. But, then still the official guidance provided in setting up the quality system is still inadequate. And therefore, there are many quality consultant who provide help in setting up the quality system according to ISO 9001.

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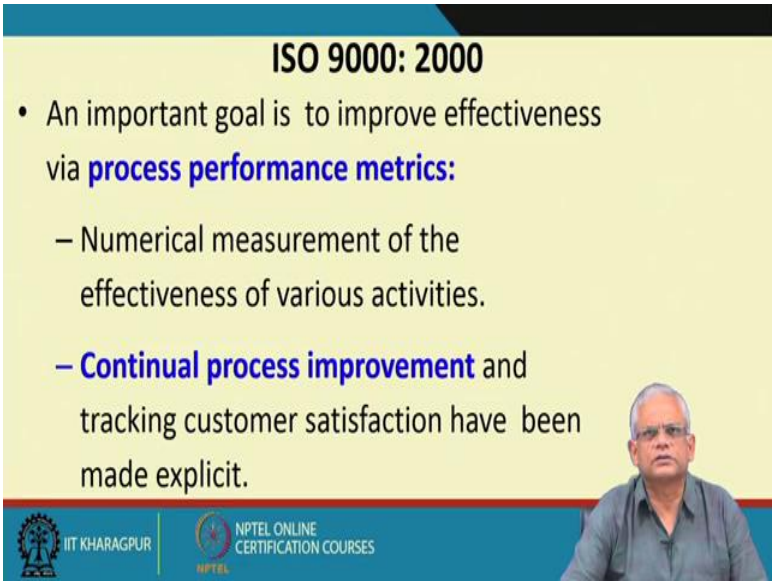

Later in the year 2000 ISO 9000 came up with a new revision. Here the important goal was to improve the effectiveness of the process by collecting performance metrics, this was not there in ISO 9001. It identified many activities, where numerical measurements need to be taken, numerical measurements or the effectiveness of the process activities.

And these measurements would be used to improve the process and also tracking of the customer satisfaction is made explicit. As you can see that ISO 9001, the original one in 1987 the main goal was quality assurance whereas, ISO 9000 the 2000 revision; it is towards total quality management, where there are process performance measurements and based on that continual process improvement has been addressed.

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But before we discuss about the details of ISO 9000 quality system, let us first discuss why it is necessary to get ISO 9000 certification, what benefits macro to an organization if we gets the ISO 9001 certification. The first thing is that a software organization to participate in a bid for some work, sometimes it is necessary to have a ISO 9000 certification. Without this they would not qualify to even participate in the bidding process. This is a good enough reason for many organizations to go for the ISO 9000 certification.

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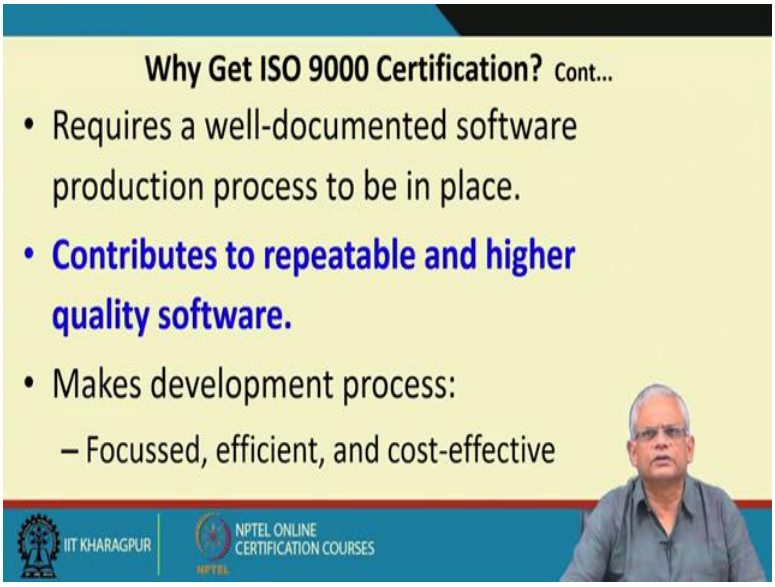

But then there are other benefits of getting the ISO 9000 certification. The ISO 9000 guidelines, the mandate that well documented software production process should be in place. And this yields benefit in the quality of the project completed, the cost effectiveness, meeting the schedule and so on.

And therefore the organizations not only get a chance to participate in the bids, but also their quality of the work, cost effectiveness, meeting schedules etcetera improves. In other words, it contributes to repeatable and higher quality software.

Over the next few slides we will be using the term repeatable. Let me just tell one sentence about what we mean by repeatable. Repeatable means that an organization can repeat its success on a project in similar projects. Let me just repeat what I said; the term repeatable means that if an organization had a success in one project it can repeat its success in similar projects. If the organization does not have a disciplined process,

documented process it may succeed in one project, but then even in a similar project it may fail, because it is not repeatable.

The success might have come due to some individual efforts, some very enterprising energetic individuals who might have worked hard to make one project success. But, then another similar project, it may be a failure if there is well documented software process, software production process is not in place.

And therefore, ISO 9000 helps in repeating success in one project to another project and also results in higher quality software. It fine tunes the development process because this gets documented reviewed. Therefore, the development process becomes more focused, efficient and cost effective.

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But one thing let us be clear before we discuss about the ISO certification. ISO 9001 certification is not really awarded by the ISO; the ISO does not in fact certify. It does not really issue any certificates the ISO by itself does not issue any certificates. The ISO by itself does not accredit, approve or control the certification bodies. There are certification bodies in every country who award the ISO certificates, but then ISO not even accredits, approves or controls the certification bodies. Every country has its own certification body which awards the ISO certificate.

But, then if we think about it there can be wide variation in the requirements to get ISO 9001 certification across countries and also it becomes sometimes very important that who had certified. For example: an Indian company may also get certified by a European certification body. Since, there is a wide variation of ISO certification it becomes important who had certified.

But, then even though ISO does not certify, it develops the standards, documents them and it also guides the certification bodies to have a uniform accreditation and certification. But the certifying bodies they can relax certain of these overlook and give still certifications.

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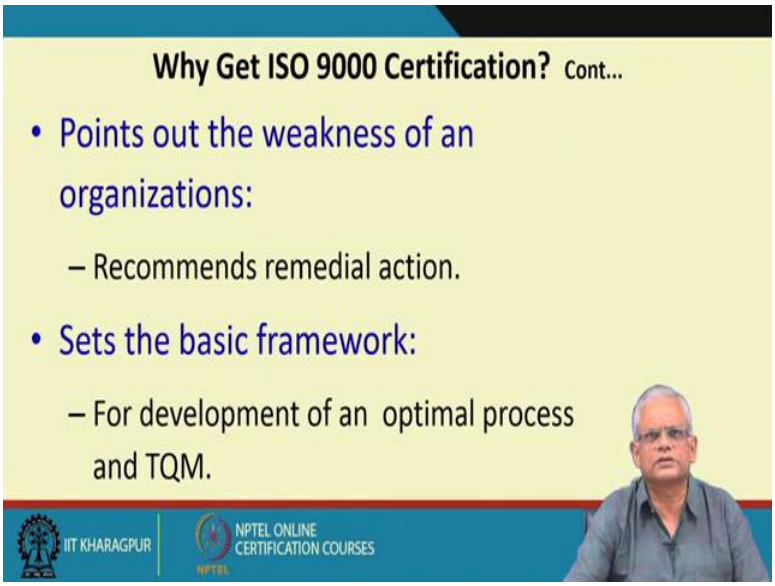

The ISO 9000 certification also points out some weaknesses of an organization and recommends a remedial action and sets the basic framework for a continually improving process.

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We have so far seen that what are the benefits of getting ISO 9000 certification for a software industry. And also some issues regarding the certification itself. For example, we said that ISO by itself does not award certificates, it just produces the guidelines, the standards and every country has its accreditation body to whom the companies apply and get certification. But, the next question that comes to mind is suppose a software development company wants to get ISO 9000 certification; what does it have to do?.

Naturally, it has to apply to an ISO 9000 registrar for registration. Every country has a set of registrars identified by the accredition body of that country and the registration body, the registrar who carries out the registration process. And there are several stages of this, let us just have a look at what are the stages at a very overview of this.

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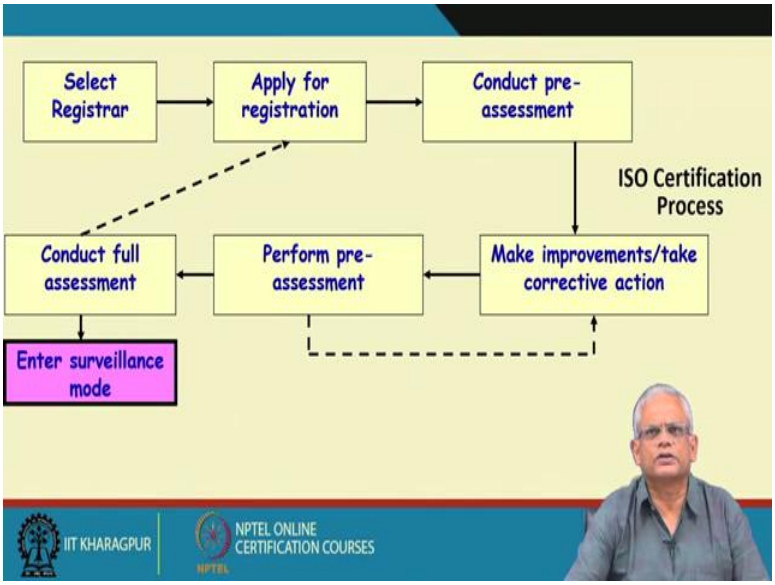

Every country as we said that there are several registrars. The company needs to identify registrar and typically a company takes the help of a consultant who sets up the companies documents, processes, helps in selecting the registrar and then they apply to the register for registration, the online application process and then provides the required documents. The registrar in turn looks at the uploaded documents and suggests some improvements and corrective action.

And this again the certifying sorry the registrar again looks at the corrected documents and this process may go on until the documents that have been uploaded are to the satisfaction of the registrar. And after this the registrar performs a full assessment that is the quality system, the process and so on. And if it is the success certificate is awarded and the company enters into a surveillance mode that is every few years it needs to again get reviewed for retaining the ISO 9001 certificate.

If the registrar is not satisfied then again suggest some corrective actions and fresh registration application need to be made. But, one thing please note here as you discussed that the entire ISO certification process is only based on the documents; the process documents, the quality system documents and so on.

We never mentioned anything about the product. So, the registrar does not even look at the product. In other words the ISO 9000 certification is not given to a product of a company, it is given to the company or the organization as a whole and not to any specific product. It is given to the process, the manufacturing process or the development

process. And the assumption is that a good process should result in a good product, but the product are not even looked at to give the certificate.

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The first stage is the application stage, apply to registrar for registration, the pre assessment stage where the registrar makes a rough assessment of the organization based on the documents uploaded.

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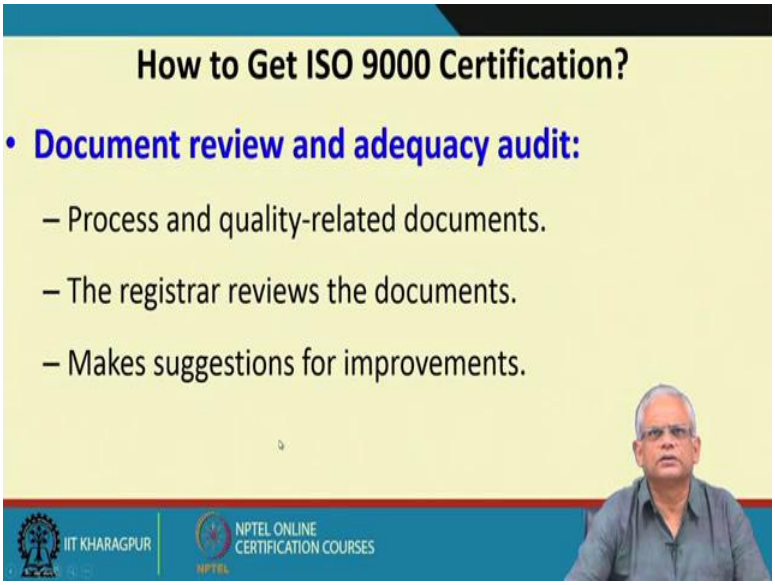

Reviews the uploaded documents and the adequacy audit, the process and quality related documents are uploaded. The register reviews the document and makes suggestions for improvements.

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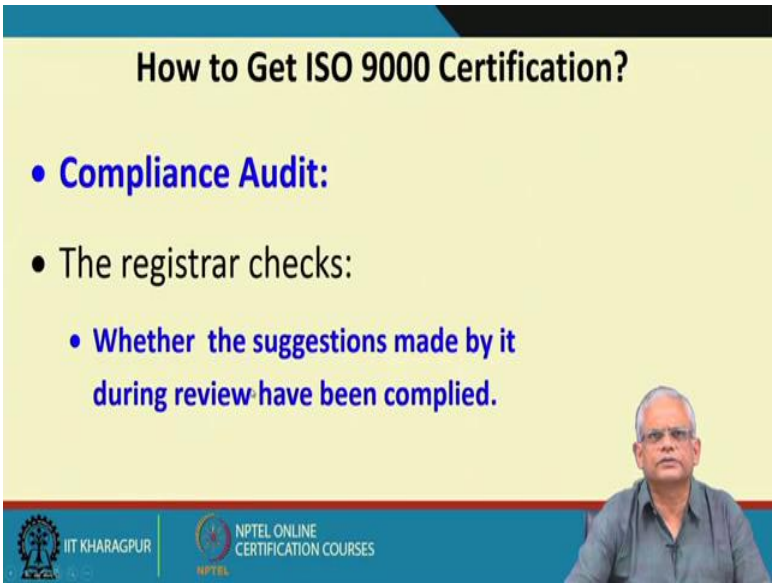

And once the company revises the document as per the registrars suggestions, compliance audit is done by the registrar. And this goes on until the registrar is satisfied whether the suggestions made by the registrar is a complied that is reviewed by the registrar.

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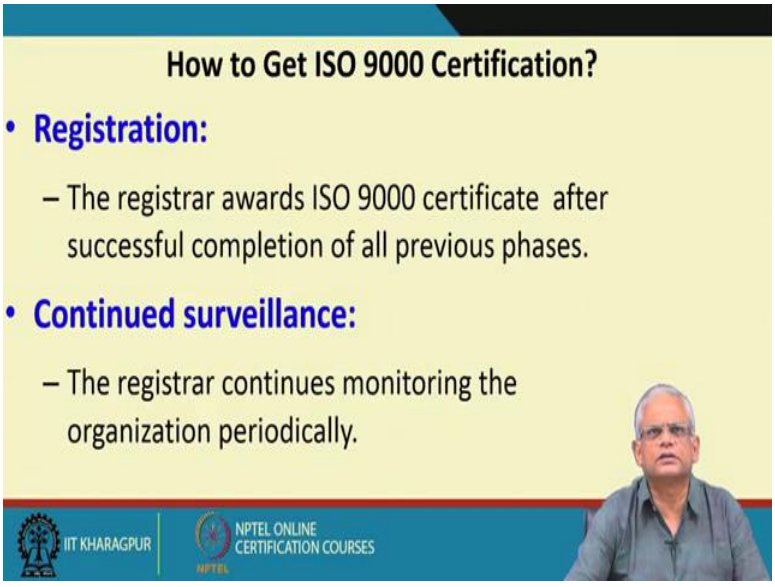

And once the registrar is satisfied, it awards the ISO 9000 certificate. But, then it is not given permanently, requires continuous monitoring by the registrar for the organization to retain the ISO 9000 certification.

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Since the certification is given based on the process of the organization, the quality system of the organization and not on the product. It is alright if the company uses the certificate in its corporate advertisements, that the organization has been certified to ISO 9000, but it cannot advertise its product. It cannot say that its products are as per ISO 9000, because the certificate is given to its process not to the product. And, if any organization uses the ISO 9000 certificate in its product advertisement then its certificate may be withdrawn.

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So, far we have looked at some basic things about ISO 9000, what benefits it provides, how to get the certification and so on. Now, let us look at what are the ISO 9000 requirements, what does the company have to do, what are the specific aspects of its process that it must clearly state in the process document. So that, it will be awarded the certificate. The first thing is the management responsibilities, the management should be committed to the quality of the products and also the quality system should be independent of the development system.

This is required that the quality system that is the people who are checking quality, they should not be working under the product manager. This is one of the requirement that they have to be independent. The product manager, the quality manager they should report to the top management only. It should not be the case that the quality manager reports to the project manager, in that case the quality may get compromised and this is one of the requirements in the quality system.

The quality system itself how it is formed, the specific documents it maintains and so on. Contract review; an organization during any of its project execution may take help of subcontractors, the subcontractors do some part of the work.

And, in this case whether the review is made of the terms and also when a organization enters into a contract with a party for to develop a software is the contract reviewed properly, is it understood what needs to be done by what time and so on, who reviews it;

these things must be detailed here. The main idea here is that unless the contract is reviewed properly and the work is accepted, then the project may not succeed.

Design control: as the design is made, it undergoes many changes due to various reasons; is the design controlled so that, the latest design is available and you can easily find out what changes had occurred to it before it and so on. In plain words this means configuration control that is using a tool a configuration management tool to keep the design documents under configuration control.

Document and data control: here all the documents and data must be under configuration control. Just see here that configuration control is really emphasized or in other words without using configuration control an organization may not get the certification. This is a very important requirement that configuration management must be used. As part of this course we will be discussing about the configuration management. Purchasing must be reviewed, control of customer supplied product again configuration control, product identification and traceability.

This is again configuration management, the product or the software as it is being developed undergoes many changes. We should be able to identify what is the latest product, what changes occurred earlier and so on. The process control: the process document must be under configuration management, because the process may change and the process document should be under configuration control.

Inspection and testing: testing is a very important requirement to get a quality product. So, both inspection and testing, the organization has to specify what are the steps of inspection, where all inspection occurs. And what are the stages of testing? Unit integration and system testing. Control of inspection and measuring test equipments, if there are some test equipments are used how are these calibrated, this also needs to be discussed.

We just looked at a very brief overview of the ISO 9000 requirements. The specific items that the organization must emphasize and also give its process for this in the documents to be uploaded. This is just a highlight, but there are many other requirements for ISO 9000, these are just the highlight requirements, some of the very important requirements. We will just look at few more requirements in the next lecture and then we will proceed further.

Thank you.