Six Sigma
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Lecture - 56
Design of Acceptance Sampling Plans for Attribute (Part – 2)

Hello friends, once again I welcome you to our ongoing journey and Six Sigma and we are discussing the control phase of DMAIC cycle, as a part of that we are talking about acceptance sampling plans and now we will go deeper into the Design of Acceptance Sampling Plans for Attributes part 2 as a part of lecture 56. There is no substitute of control chart we always refer this and we strengthen our faith.

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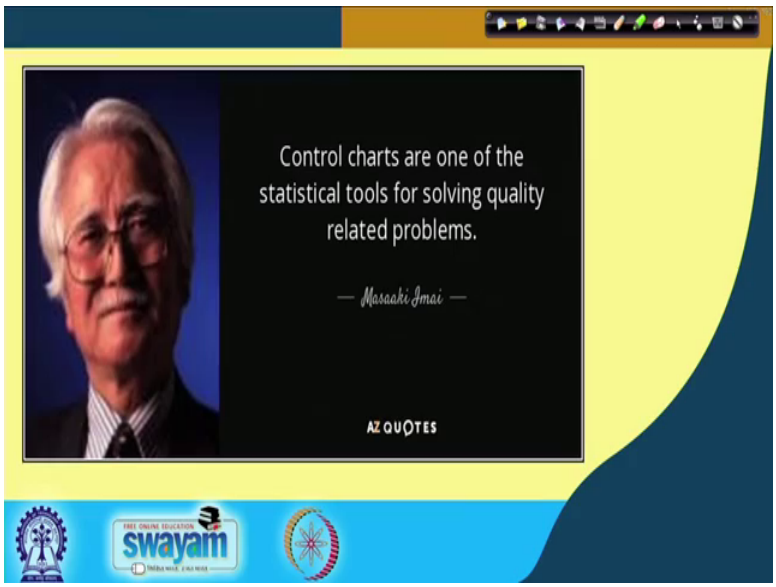

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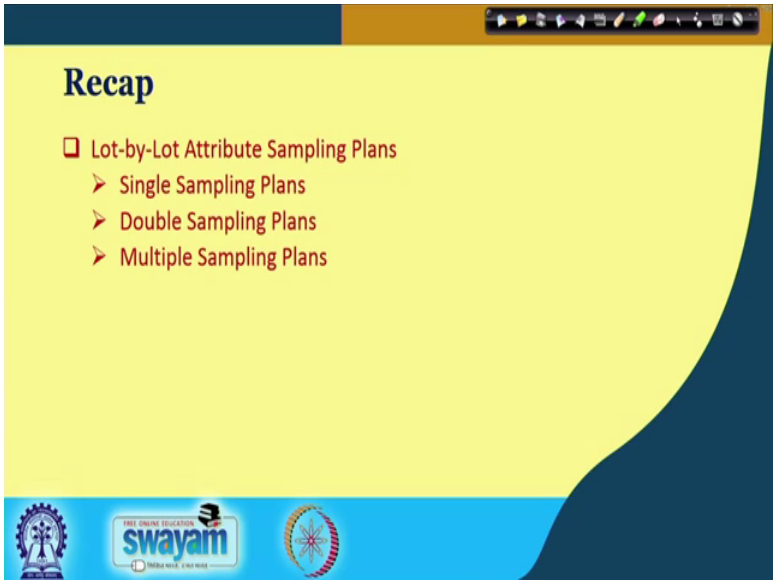

If you recall we had a detailed discussion on lot by lot attribute sampling plans, single sampling plans, double sampling plans and multiple sampling plans and we have seen the Grubb's table and how to develop and design a particular sampling plan, whether it is single double or multiple what is the impact of n and c on the operating characteristic curve and how the discriminatory power of the sampling plan is affected.

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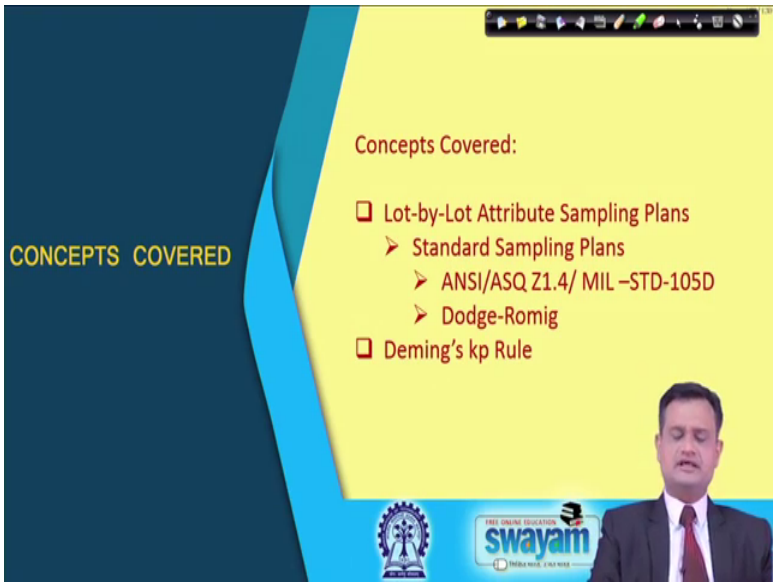

So, we had seen all this thing now as a part of this lecture we would like to go by lot by lot attribute sampling plan and already we have discussed single, double and multiple something which is still required or left is standard sampling plans and broadly they are

of 2 category; one is ANSI ASQ Z14 MIL STD 105D and second one is the Dodge Romig and another very good easy to follow sampling procedure is Deming's kp rule.

So, first we will try to complete with our lot by lot attribute sampling plan and in that we will discuss the standard sampling plan, typically two kind ANSI military standard and Dodge Romig and another one is Deming kp rule.

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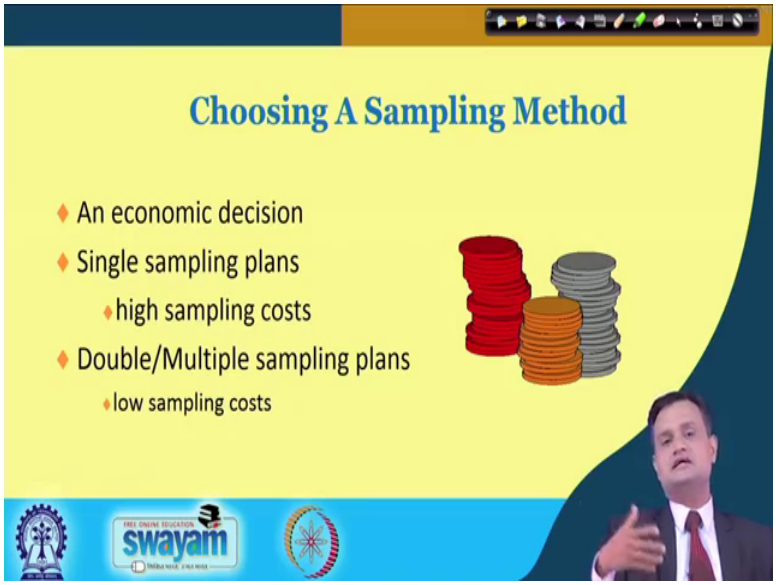

So, as I mentioned sampling helps us to reduce the cause, it's an economic decision and single sampling plan has high sampling cost, but the administration is easy, double sampling multiple sampling the sampling cost is less.

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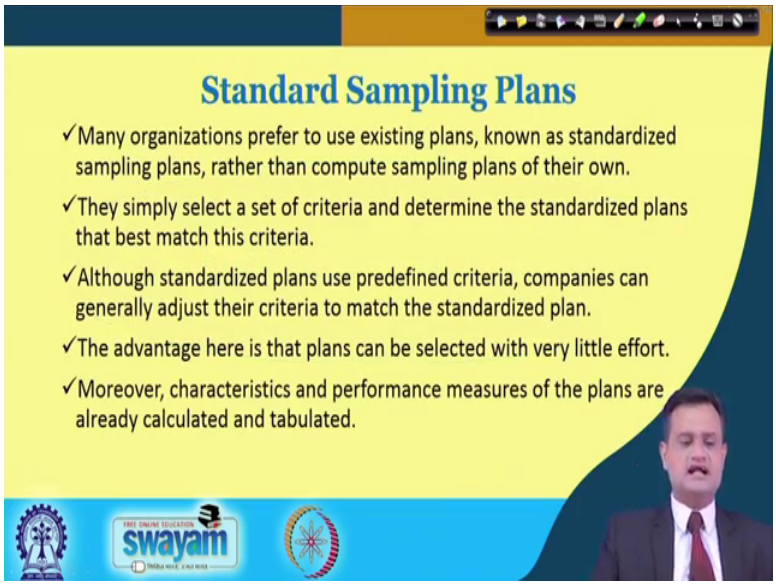

So, now let us see the standard sampling plan. So, many organizations they are not interested in doing what we have done in the previous lecture, finding the values of c and all these based on producers risk and consumers risk and other things. In a traditional way they have to do, but in a traditional way they want to go for some standard procedure or some standards available as a part of military standards sampling plans and they are more comfortable in the use of this sampling plans.

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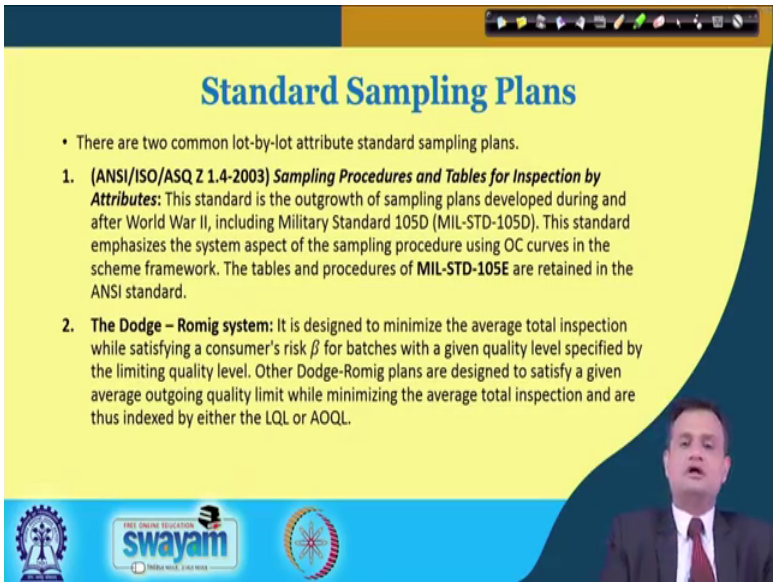

So, typically we have two categories of sampling plan ANSI ISO ASQ Z14 2003 and this plans basically are developed during world war 2, when they had lot of inspection to be carried out and it includes the military standard typically called as MIL STD 105D. And typically this kind of plans they emphasize the system aspect of the sampling procedure and they are written in the ANSI standard, so MIL STD is part of these ANSI.

The other category of standard sampling plan is Dodge Romig system and typically this is design with an objective to minimize the average inspection while satisfying the consumers risk that is beta. So, offering protection to the consumer with a given quality level specified by the limiting quality level that is LQL.

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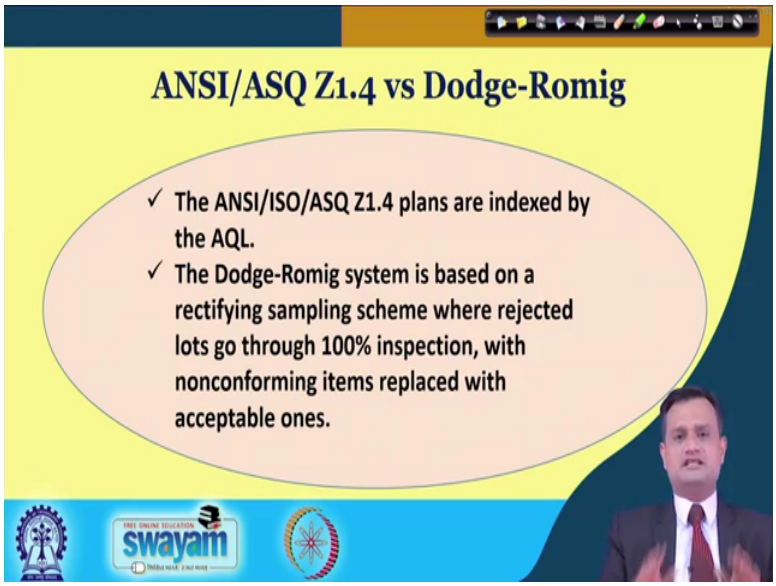

So, we will try to refer broadly this two categories of the standard plan as a part of lot by lot attribute sampling and if I just put it in a very simple way then ANSI, ISO, ASQ Z1.4 plans are indexed AQL and if you see the Dodge Romig other standard plan, then it is based on the rectifying sampling scheme where the entire rejected lot go through the 100 percent inspection and with non coming and a confirming items are replaced with the acceptable once.

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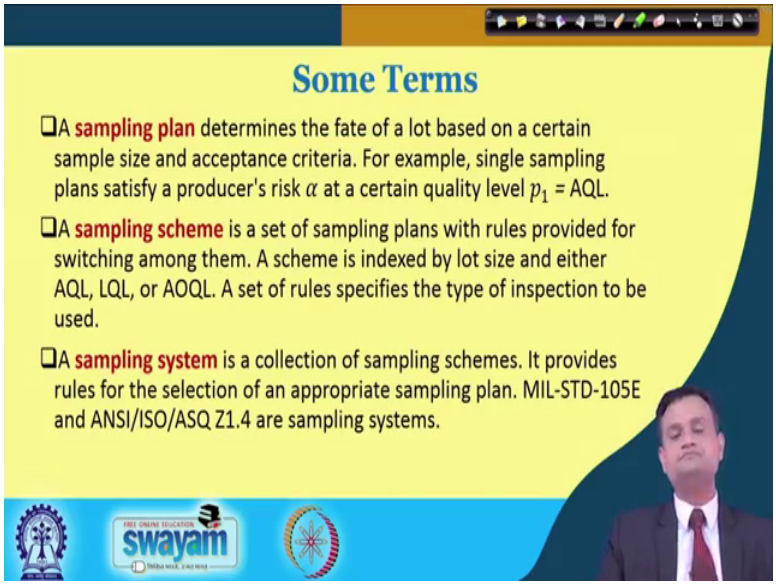

So, this is the difference main difference between these two. Now before we go ahead let us try to say have some appreciation of the key terms, so first is a sampling plan. So, typically it determines the fate of a lot; fate of a lot and I have used another word if you recall sentence. So, it may punish the lot, so determines the fate of a lot based on a certain sample size and acceptance criteria and for example, we have seen in the single sampling plan that satisfies a producers risk alpha p 1 is equal to AQL. So, producer stipulated risk we have seen this examples in detail.

Now, a sampling scheme typically sets the rules provided for switching among them in a scheme is indexed by lot size your AQL, LQL, AOQL and set of rules specify the type of inspection to be used. So, now, here you will see little difference that it is not a same level of inspection you may even vary the level of inspection depending upon the quality of the lot.

The third one is the sampling system. So, it's a collection of sampling schemes and basically provides the rule for selection of an appropriate sampling plan. So, MIL STD 105E ANSI I will call them as the sampling systems.

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So, these are the key terms useful in understanding the standard sampling plan. Let us try to focus on 2, one is MIL STD 105D this is the Military Standard plan and part of your ANSI and second is Dodge Romig system.

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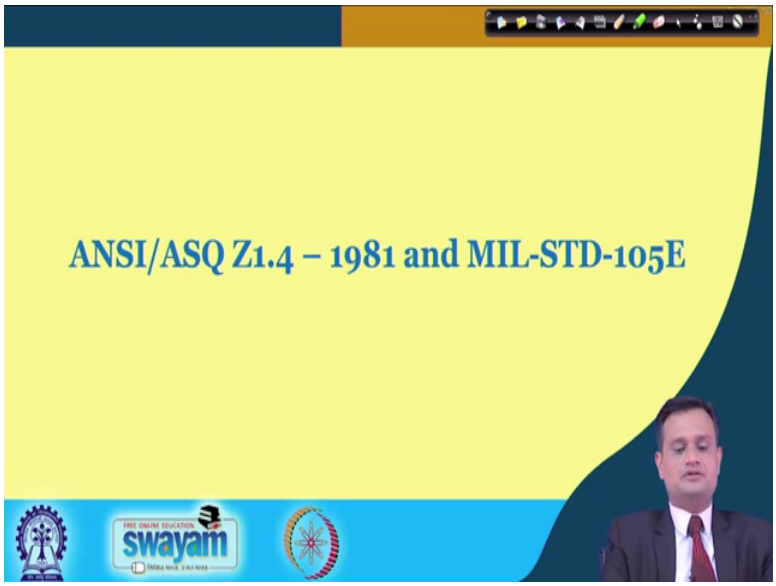

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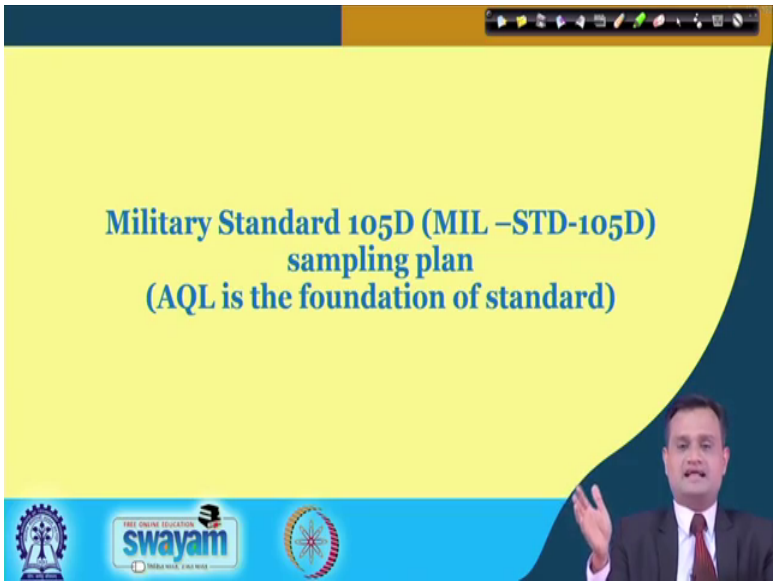

So, this is your ANSI ASQ military standard plan and typically this is based on AQL, so your average quality level acceptable quality level it is based on your AQL.

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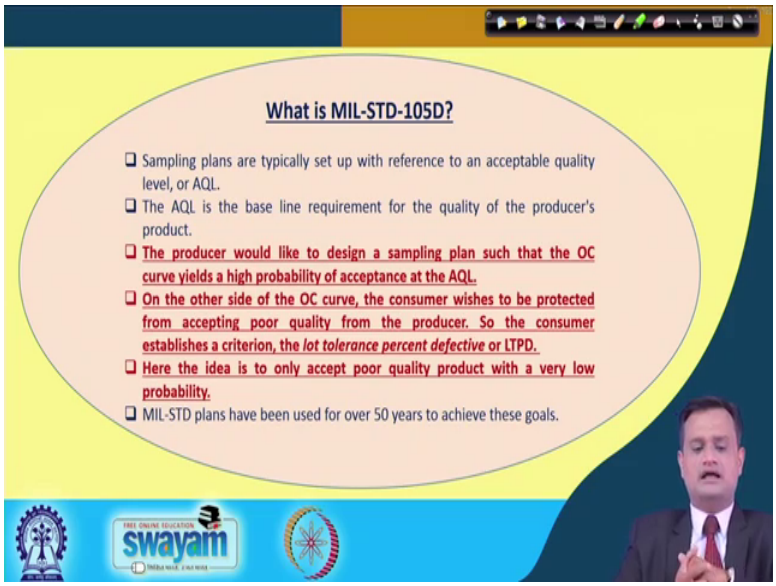

So, now here what exactly I would like to do? So, producer would like to design a sampling plan such that, the OC curve yields a high probability of acceptance at AQL that is Acceptable Quality Level. Simultaneously my consumer would like to have a protection for limiting quality level or LTPD at the beta percent.

So; obviously, I have to look into this two aspects as usual and then I have to think about the sampling plan and MIL STD 105D, typically this plans are used over 50 years with many modifications, they try to address this issues.

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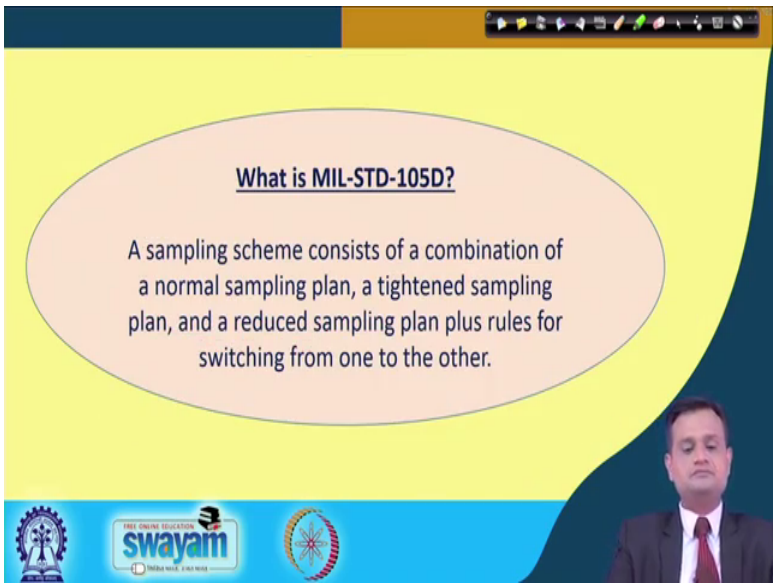

So, in a simple way MIL STD 105D is a sampling scheme consist of a combination of normal sampling plan, a tightened sampling plan and a reduced sampling plan plus rules for switching from one to another. So, we have so far not talked about the level of inspection. Here you will see that we will also consider the level of inspection and the condition which will help us to switch from one particular say plan to another plan and this kind of thing is part of your ANSQ or military standard sampling plan.

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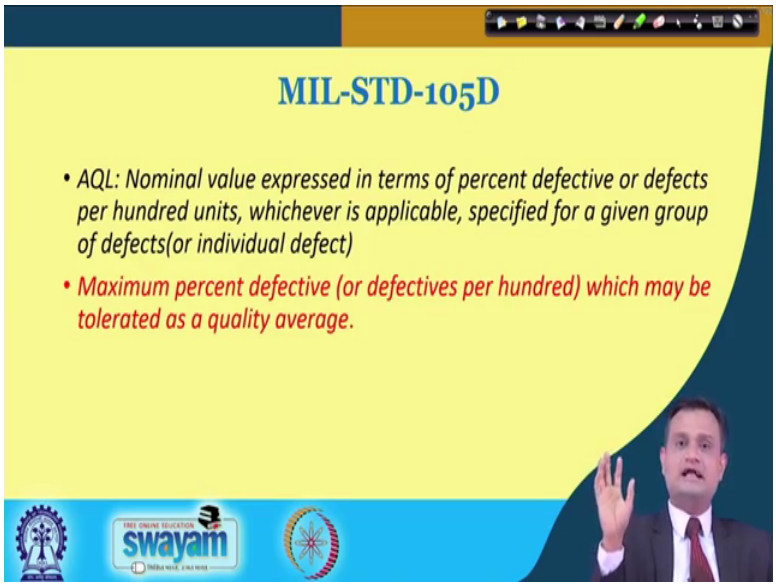

So, AQL is your nominal value expressed in terms of percent defective or defects per 100 units, whichever is applicable specified for a given group and this is the maximum percent defective which may be tolerated as quality average, so this we have seen.

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Now when you refer ANSI MIL STD fine MIL STD is part of ANSI, but there is just little difference. So, the difference is like this MIL STD and ANSI the term nonconforming is substituted for defect in ANSI ASQC Z14. An optimal procedure for switching from normal inspection to reduced inspection is included in your ANSI and the scheme aspect of sampling is emphasized in ANSI ASQC Z14.

So, 5 additional tables for scheme performance are included, three types of sampling plan single, double, multiple and the sampling plans can be applied to variety of situations say, it may be the end material or may be the raw material or components or operations and so on.

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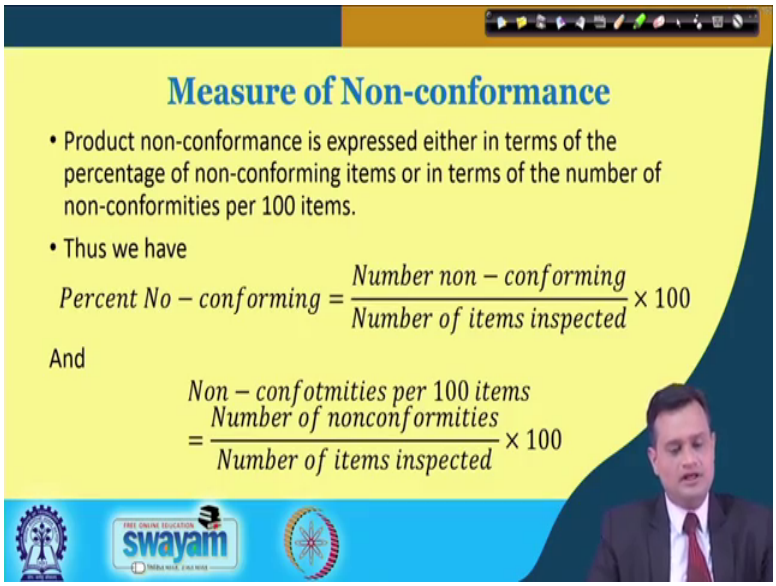

Now, if we just see the measure of non conformance then the percent nonconforming can be found as number nonconforming divided by number of items inspected into 100 or you can say nonconforming for 100 items number of non conformities and number of items inspected when you take the ratio multiply by 100.

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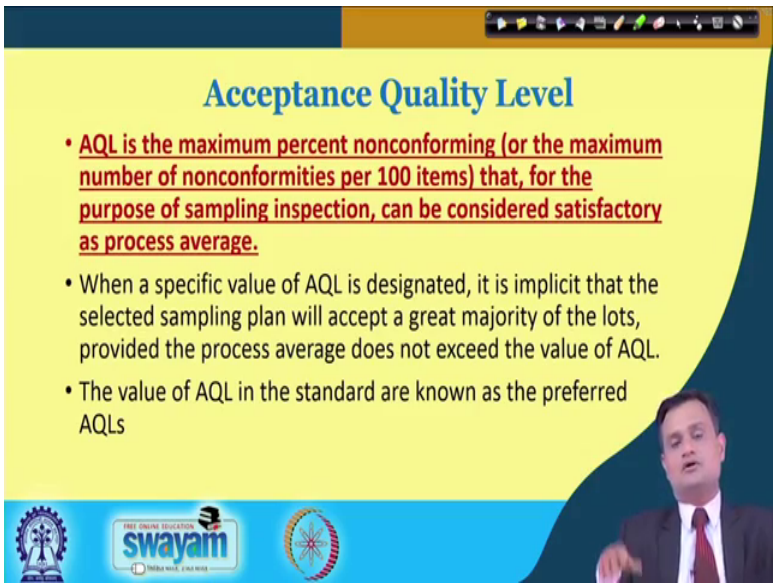

So, I would just like to remind you the important term Acceptance Quality Level this is AQL is the maximum percent nonconforming, maximum nonconformities per 100 items

that is for the purpose of sampling inspection, it can be considered satisfactory as process average. So, I am just trying to set the parallel between these two.

So, far we were only using AQL, but this AQL basically is an indication of your process average and you can use your AQL also as a process average. So, when a specific value of AQL is designated it is implicit that the selected sampling plan will accept a great majority of the lots provided the process average does not exceed the value of the AQL.

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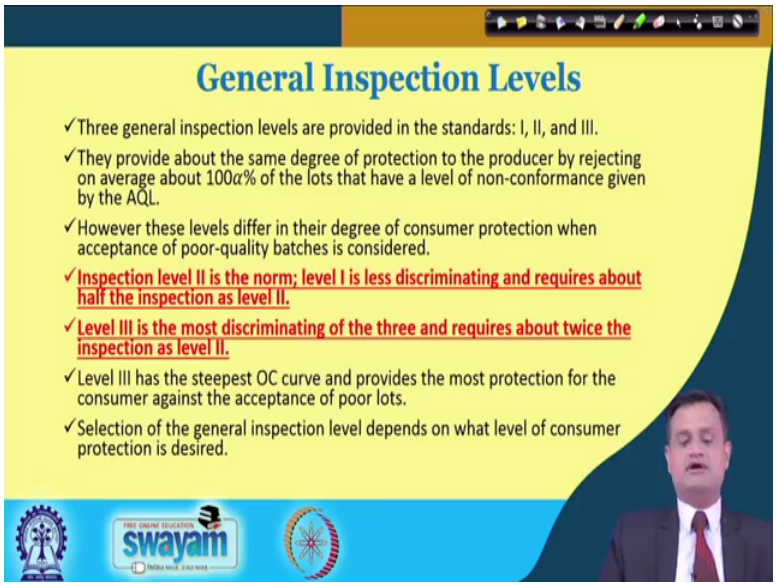

So, this is the acceptable quality level, now we are talking about the inspection level that is the additional feature when we talk about the standard sampling plan. So, you have something called general inspection level. So, there are 3 general inspection levels I, II and III and as you go on the higher side from let us say 1 to 2 and 2 to 3, then your level of inspection is increasing.

So, typically they provide about the same degree of protection to the producer by rejecting on average about 100 alpha percent and inspection level II is the norm, 1 is less discriminatory and requires about half of the inspection compared to 3. Level III is more discriminatory. So, as I mentioned as you go from level I to level I to level III and it just goes my inspection level in the increasing order.

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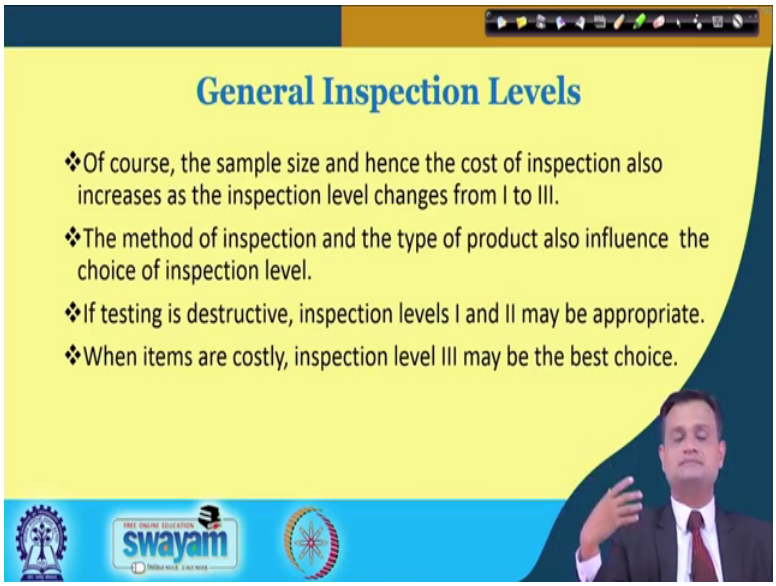

So, I have the general inspection level and cost of inspection also increases because I am trying to apply more and more tighter inspection. So, when I change from level I to level III and if testing is destructive there is a recommendation inspection level I in II may be appropriate, but if items are costly then inspection level III may be the best choice. So, I gave you the example that aircraft industry say, if they are purchasing highly precise item then; obviously, they need to apply a stringent high level inspection to see that they do not call for a problem later on when a faulty component is fitted in the aircraft.

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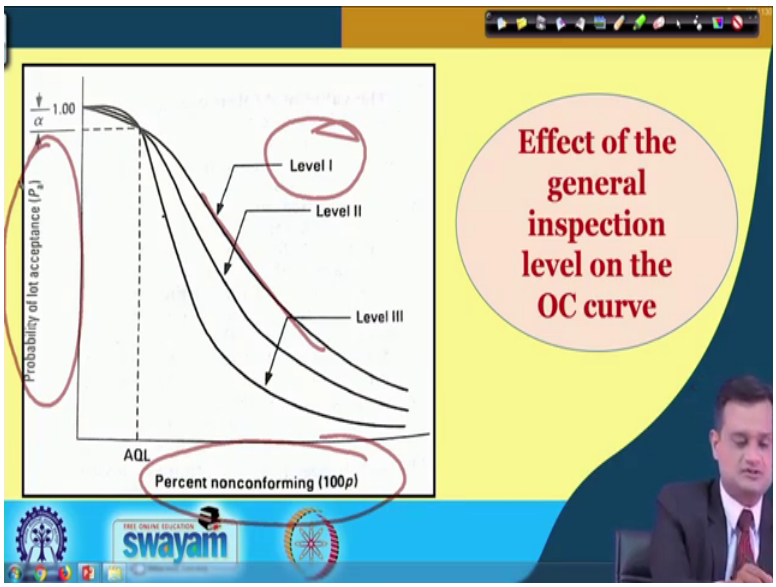

So, just see and appreciate that we have level I which is less discriminatory because the OC curve is stiffer you are comfortable with this percent nonconforming and probability of lot acceptance this is my alpha. And level II is more discriminatory level III is the highly discriminatory in terms of it's ability to separate out the good and bad quality lot.

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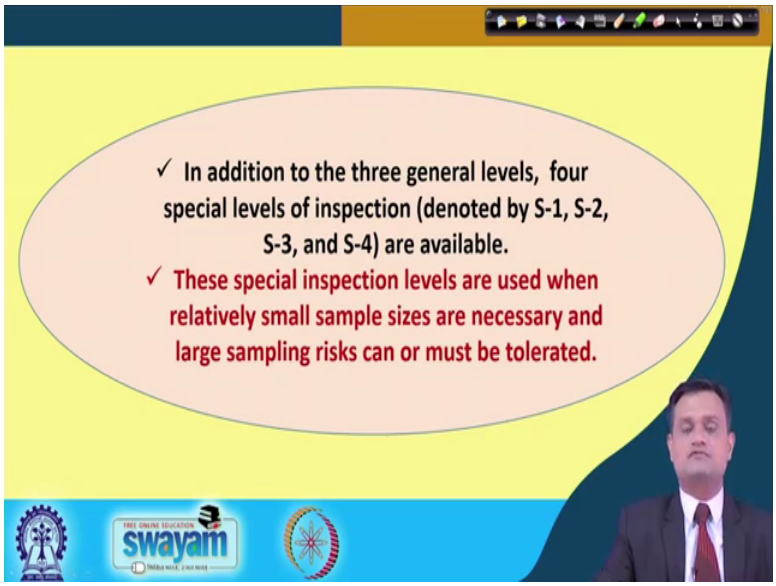

Now, in standard plans you have some more variety and this says that in addition to the general level, four special levels of inspection denoted as S 1, S 2, S 3and S 4 are available. So, this special inspection level typically you use when, relatively small sample sizes are necessary and large sampling risk can or must be tolerated So, when these condition prevails you go for this four special levels of inspection S 1, S 2, S 3and S 4 in addition to your general level.

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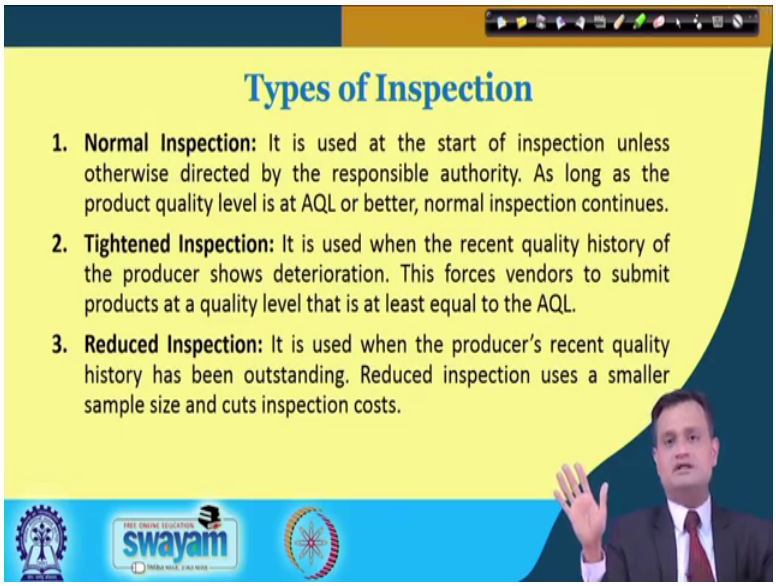

So, if we just see the type of inspection then you have normal inspection and usually it is used at the start of inspection unless otherwise directed by the accountable and responsible authority and as long as the product quality level is at AQL or better you are comfortable with the normal. So, if your process is producing let us say or AQL is 3 percent, it is more or less producing 3 percent defective you are happy with that and you will only apply the normal inspection level.

If let us say, you go for say recent history of the producer and you find that there is lot of deterioration. You are purchasing the material from some vendor and you find that there is lot of rejection or defects or if you see the process capability of your supplier and it is going down, then there is a risk and you would like to go for the increased inspection that is called tighter inspection. And third is the reduced inspection this is other way round that when producers recent quality history has been outstanding almost 0 or very less percent defective, then you can record or you can go for the reduced inspection and use the smaller sample size to cut upon the inspection cost.

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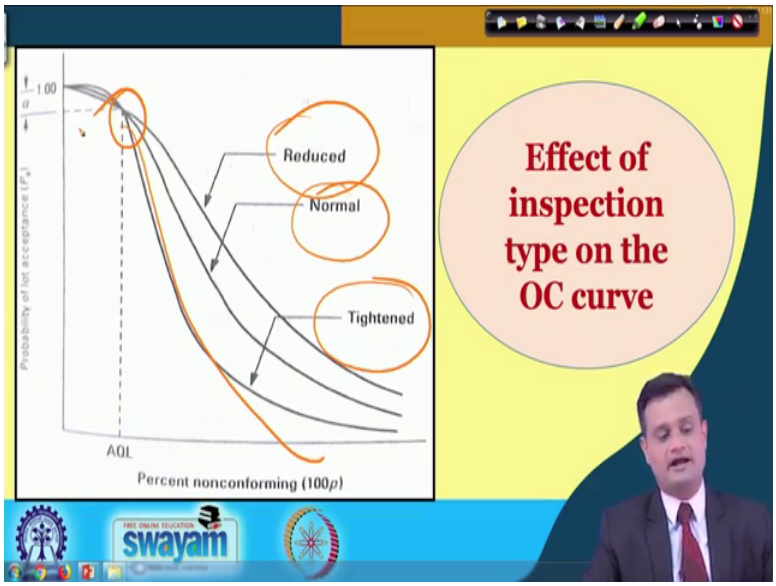

So, once again you can see the impact of these on the discriminatory power this is reduced; obviously, the discriminatory power is less this is normal little bit higher because it is cheaper and tighter. So, it is cheaper, but you can see that all these 3 OC curves they pass through one point that is AQL.

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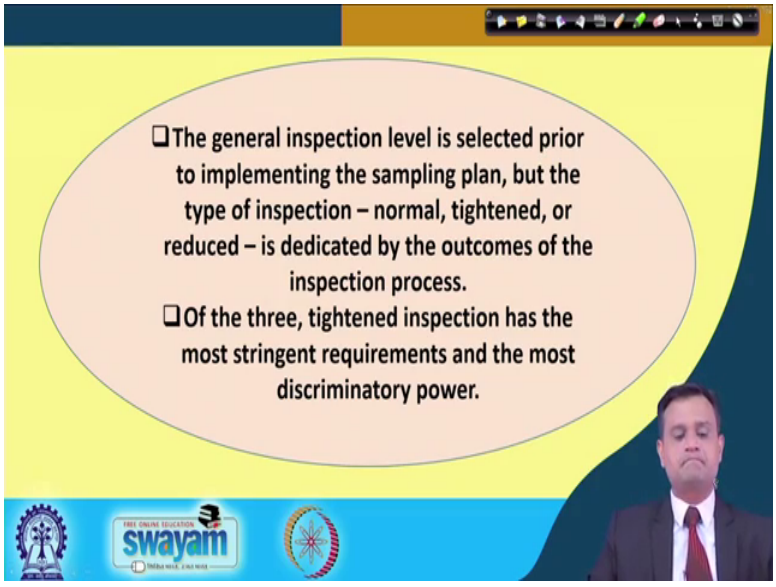

So, with this understanding I would say the general inspection level is selected prior to implementing the sampling plan, but the type of inspection normal, tightened or reduced it decided by the outcomes of the inspection process. Too much rejection from the

vendor's material I have to go for tighter excellent history I will go for reduced otherwise I will be happy with the normal.

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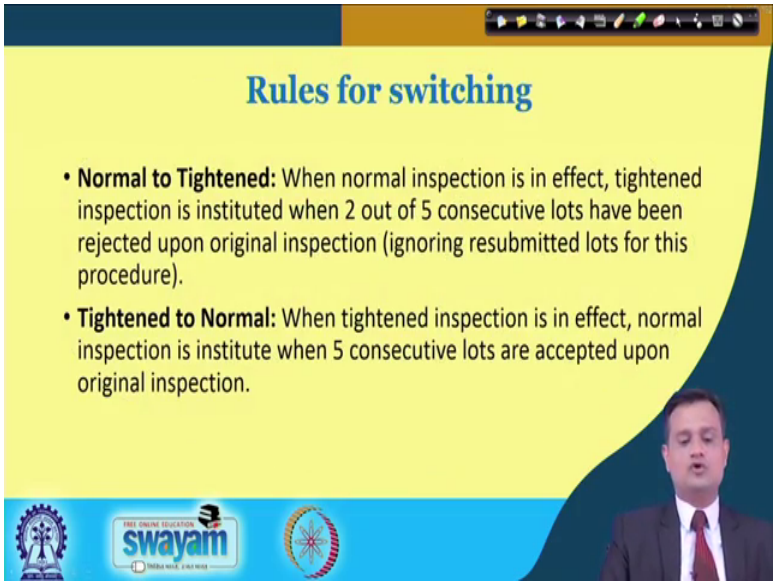

So, rules for switching now this is something that is really an appealing factor of my standardized sampling plan, that I will not stick to only one inspection level and unnecessarily spent or bare inspection cost. So, there are some rules for switching let us say I want to switch from normal to tightened inspection. So, the condition is that when normal inspection is in effect means you are using, tightened inspection is instituted when 2 out of 5 consecutive lots have been rejected. So, you get an idea that there is some problem with the lot quality and you go for switch over to the tightened.

Now, other way round is also possible tightened to normal, so normal inspection is instituted when 5 consecutive lots are accepted upon the original inspection. So, you can move from normal to tightened and tightened to normal and obviously, when you go to a doctor you have a problem, he will prescribe some medication and once again you go when the problem has gone down he will also reduce the medication. Exactly same way we try to leverage the advantage by switching on the cost I have to bare on the inspection.

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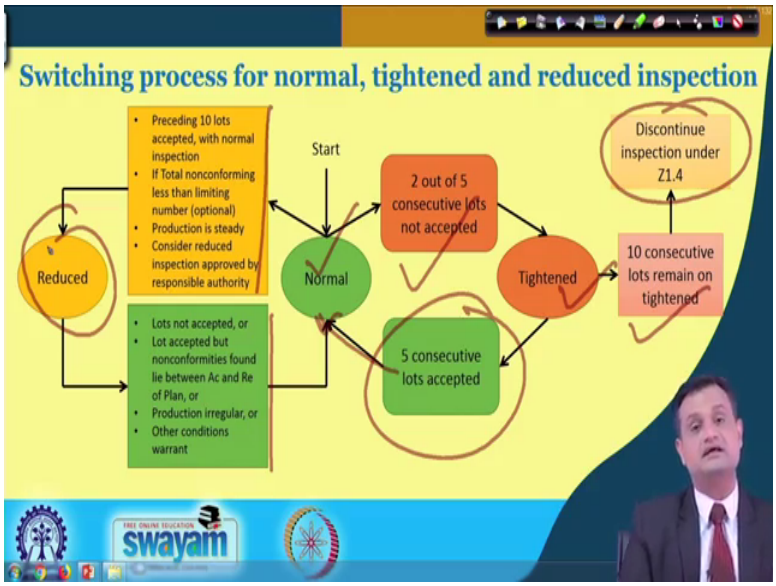

So, this is something which I explained in very simple way begin with the normal and then if 2 out of 5 consecutive lot go for the tightened, if let us say 10 consecutive lots remained tightened means still the quality is a problem discontinue and identify the real root cause get rid of it change the vendor whatever step is necessary management can decide. If let us say 5 consecutive lots are accepted go back to normal and these are some of the points I have indicated about the reduced inspection.

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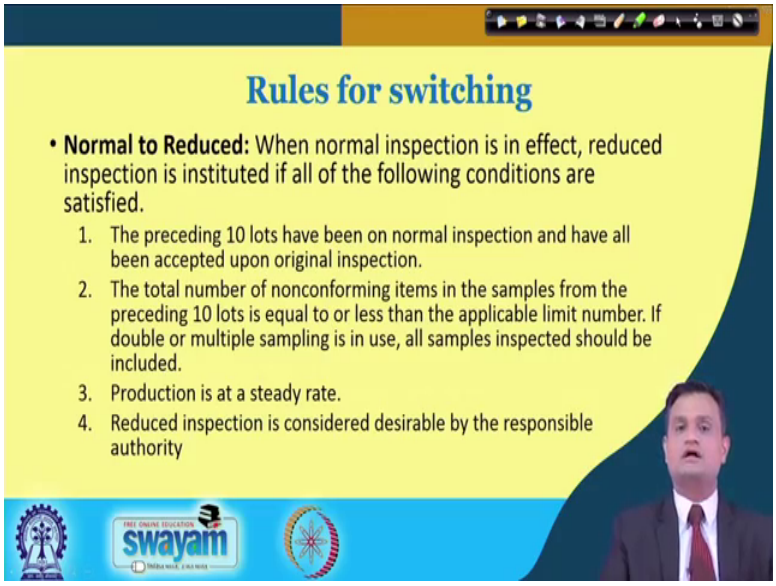

So, you can follow this procedure in a very simple way and switch over is possible. So, I have just elaborated on rules of switching normal to reduced day the preceding 10 lots have been normal inspection have been accepted. Total number of nonconforming items in the samples from the proceeding 10 lot is equal or less than the applicable limit number, production is at steady rate reduced inspection is considerable and responsible authority can decide. So, this is normal to reduced.

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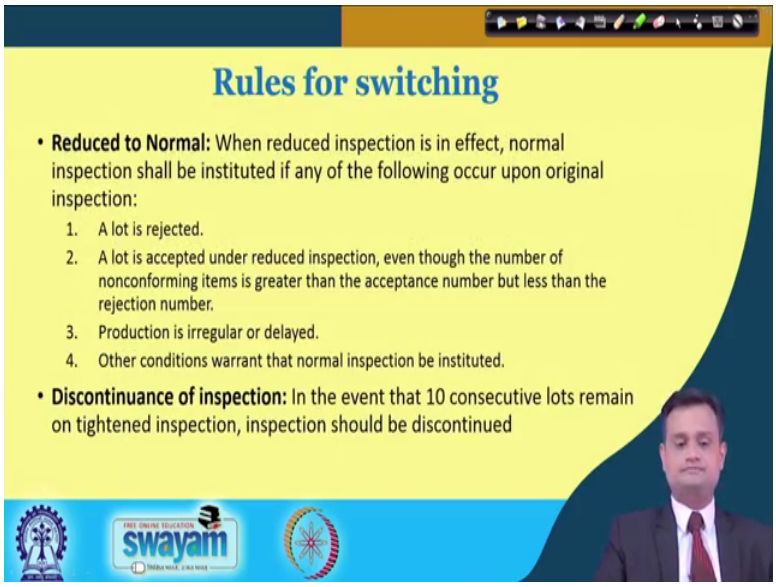

Reduced to normal a lot is rejected, lot is accepted under reduced inspection even though the number of nonconforming items is greater than the acceptable number production is regular or delayed and discontinuation of the inspection in the event 10 consecutive lot remain in the tightened inspection zone, it means the quality is really a problem.

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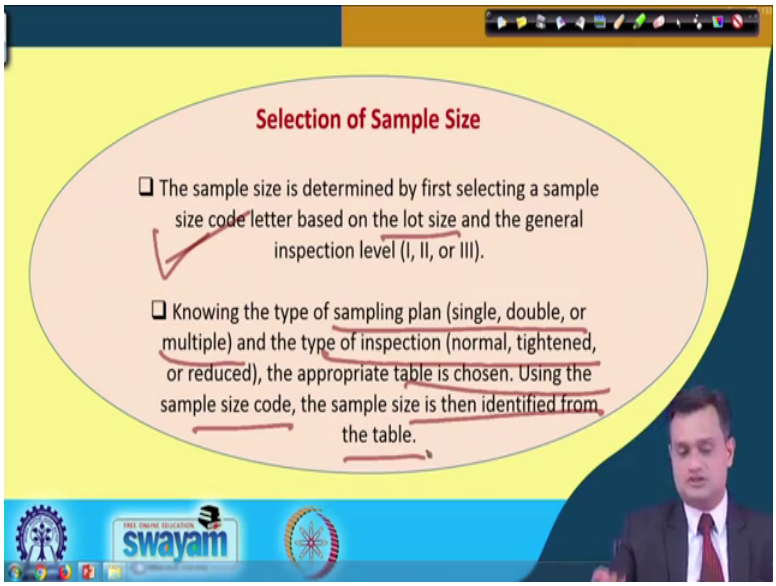

So, now, we talk about the sampling selection of the sampling plan under the standardized schemes of ANSI and then Dodge Romig. So, selection of the sample size we follow a very simple procedure say, the sample size is determined by first selecting a sample size code letter based on the lot size and the general inspection level. So, you know the health of your process you choose the inspection level or whatever you are using and then you have the lot size you will get a particular sample size you can select the sample size based on a code letter.

So, knowing the type of sampling plan this is the another thing, now you know that whether you want to go for single double or multiple and type of inspection normal tightened or reduced the appropriate table is chosen and using sample size code sample size is then identify from the table. So, just see how it operates and the idea will be clear.

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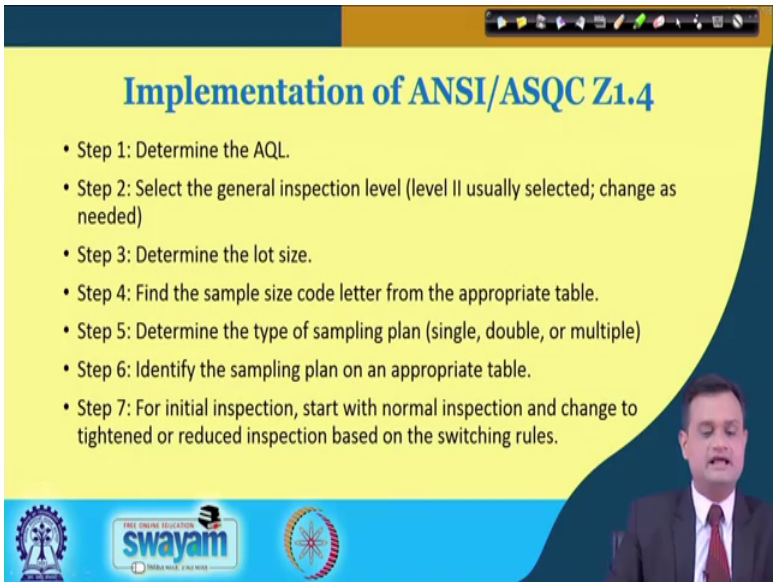

So, there is nothing much to say do say, determine the AQL, select the general inspection level II is usually selected, determine the lot size, find the sample size code later from the appropriate table, determine the type of sampling plan single double or multiple, identify the sampling plan on an appropriate table and for initial inspection start with the normal inspection and change to as I explained tightened or reduced inspection based on the switching rules.

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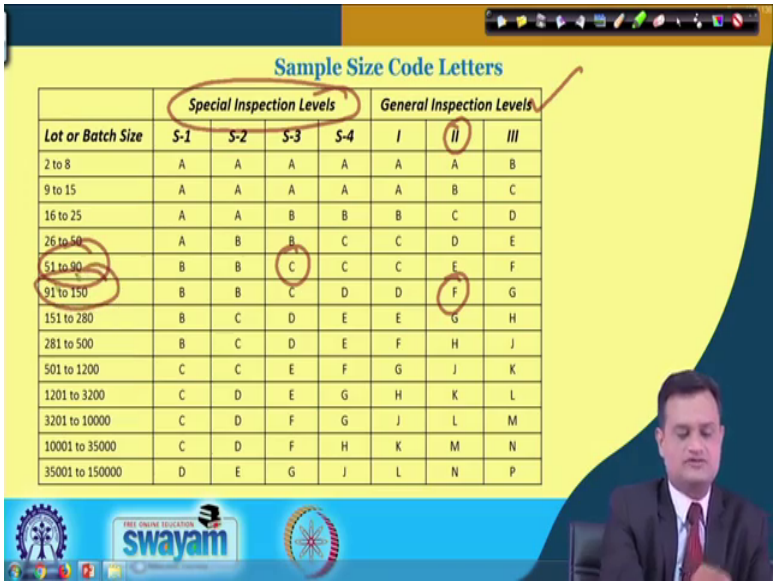

	Special Inspection Levels				General Inspection Levels		
Lot or Batch Size	S-1	S-2	S-3	S-4	I	II	III
2 to 8	A	A	A	A	A	A	B
9 to 15	A	A	A	A	A	B	C
16 to 25	A	A	B	B	B	C	D
26 to 50	A	B	B	C	C	D	E
51 to 90	B	B	C	C	C	E	F
91 to 150	B	B	C	D	D	F	G
151 to 280	B	C	D	E	E	G	H
281 to 500	B	C	D	E	F	H	J
501 to 1200	C	C	E	F	G	J	K
1201 to 3200	C	D	E	G	H	K	L
3201 to 10000	C	D	F	G	J	L	M
10001 to 35000	C	D	F	H	K	M	N
35001 to 150000	D	E	G	J	L	N	P

So, just see this suppose let us say my lot size falls somewhere here and I want to go for special inspection level then, I will let us say choose either S 1, S 2, S 3 and S 4 I will say let us S 3, so I will say my code letter code is C. Suppose I am going for general inspection level and I am choosing let us say 2 the I will let us say, for lot ranging in this I will say my letter code is F.

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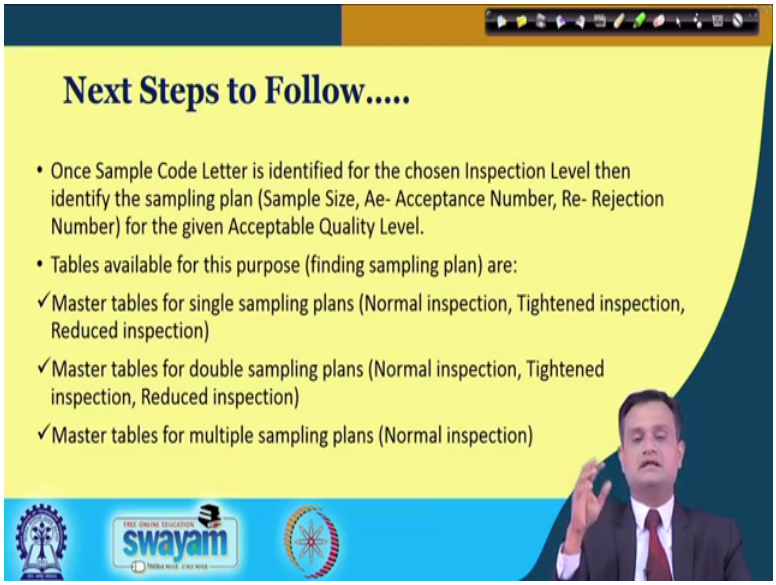

So, this is very simple to identify, now what is to be done? Once the letter code is identified for the chosen inspection level, then identify the sampling plan what you will do? Sample size, acceptance number, rejection number, for the given acceptable quality level.

So, tables are available for this purpose and you will find it in the book Mitra and other books suggested. So, there are master tables for single sampling plan and you will find here that master tables for single sampling plan again are available, for normal inspection tightened inspection reduced inspection. Similar way master tables for double sampling plan available for normal inspection, tightened inspection and reduced inspection and similar way master tables for multiple sampling plan you will have only for the normal inspection.

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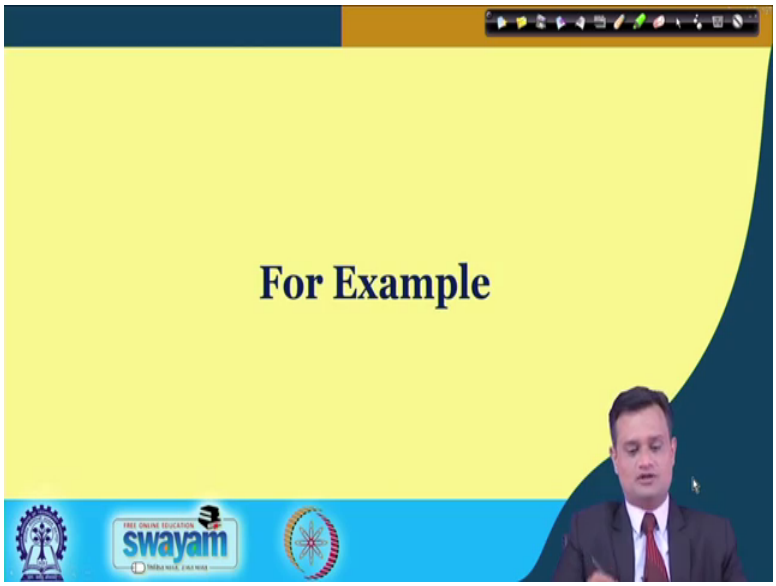

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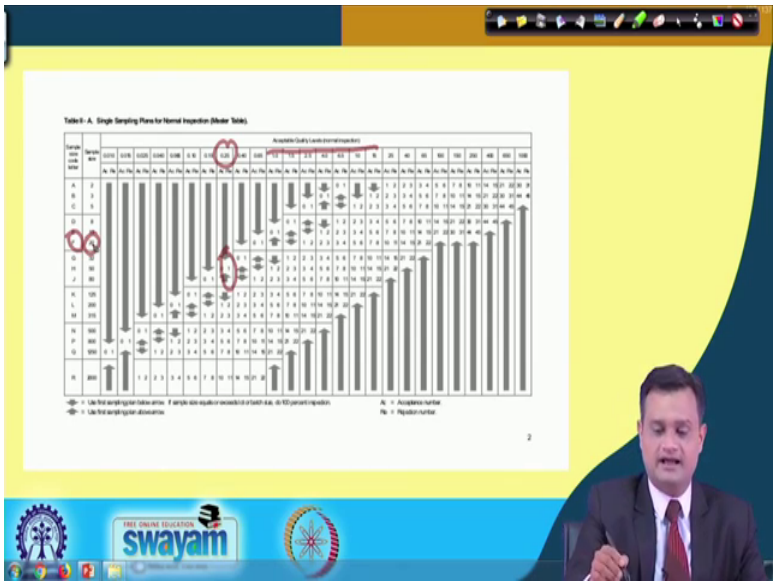

So, if we just see the example then once I have identified the code letter code let us say my letter code is F, then I will get the sample size and let us say I have this acceptable quality level AQL 0.25, then this particular thing becomes my acceptance number and rejection number already I got the sample size and I can have my sampling plan.

So, this is typically the master table for single sampling plan, for normal inspection likewise you will have many table, for single double multiple sampling plan as well as for tighter inspection, normal inspection and you can easily choose the sampling plan.

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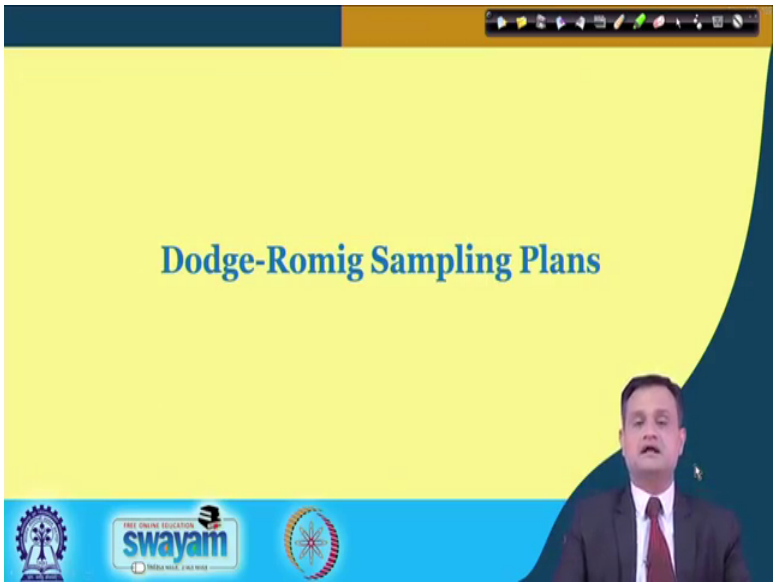

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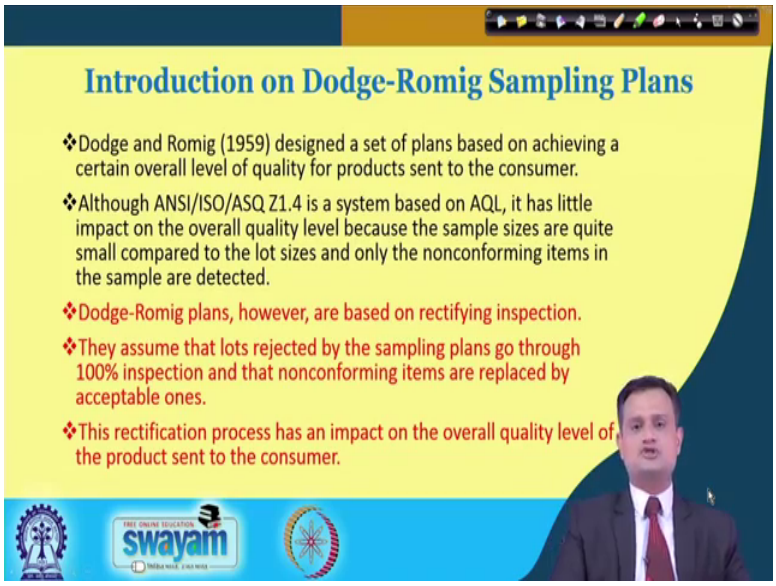

Now, let us see the second scheme that is Dodge Romig sampling system sampling plan and typically they are based on the rectifying sampling and we have seen that ANSI your military standard is based on AQL and it has little impact on the overall quality level because your sample size are quite small. So, this we are trying to overcome in case of my Dodge Romig system and I will use the concept of rectification it means all the nonconforming items would be replaced, the rejected lot will be 100 percent checked and nonconforming items will be replaced.

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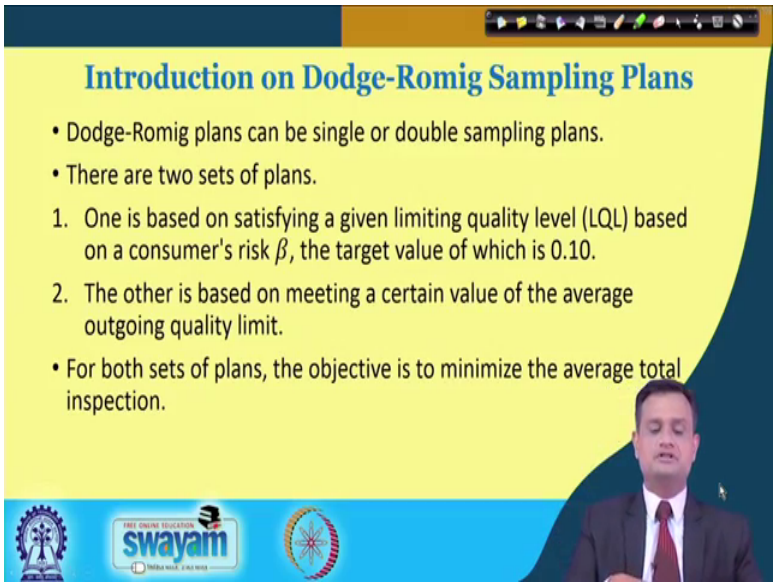

So, I have the Dodge Romig scheme and one is based on there are two sets of plans; one is based on satisfying a given LQL that is Limiting Quality Level specific to my consumer risk beta and the target value usually is 0.1 that we are following and the second set of plan is based on meeting the certain value of average outgoing quality limit.

So, I have two different types of plan, I can choose both depending upon the objective that either I want to minimize the average total cost of inspection or I want to be more critical in terms of my consumer protection or may be in terms of say other criteria like average outgoing quality limit.

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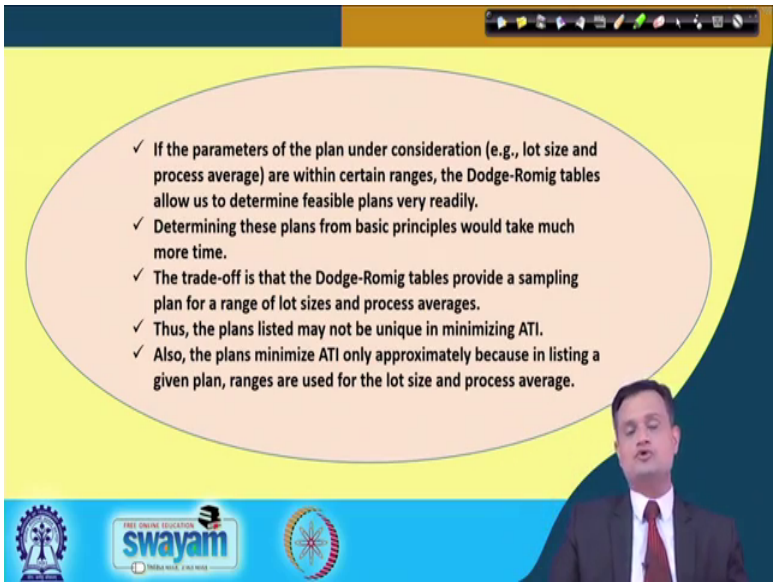

So, here if the parameters are of the plan are under consideration like lot size process average are within certain ranges, this Dodge Romig tables allow us to determine feasible plan very easily and readily. Determining this plans from principles would take much more time, so whatever principles we have used for designing the plans under single sampling, double sampling that will take much more time.

And the tradeoff is that particular this Dodge Romig table provide a sampling plan for a range of lot size and process averages. So, this is the tradeoff we get for range of sampling plan and the lot sizes you can easily readily figure out an appropriate plan. So, it also minimize the Average Total Inspection ATI and these are couple of advantages.

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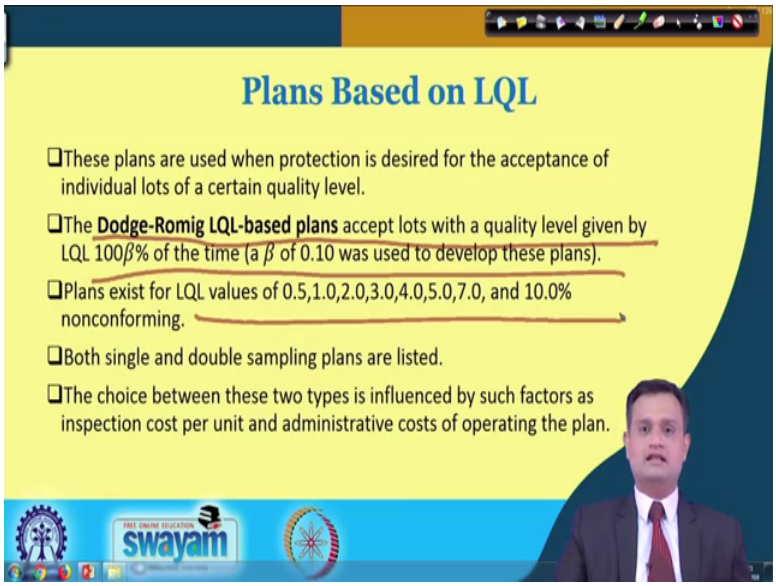

So, if you see the Dodge Romig LQL based plan 100 beta percent that beta of 0.1 was used to develop let us say this plan that is the standard value and let us say I can have different LQL level Limiting Quality Level that is my consumers specific to consumers risk 0.5, 1.0, 2.0 and both single and double sampling plans can be found.

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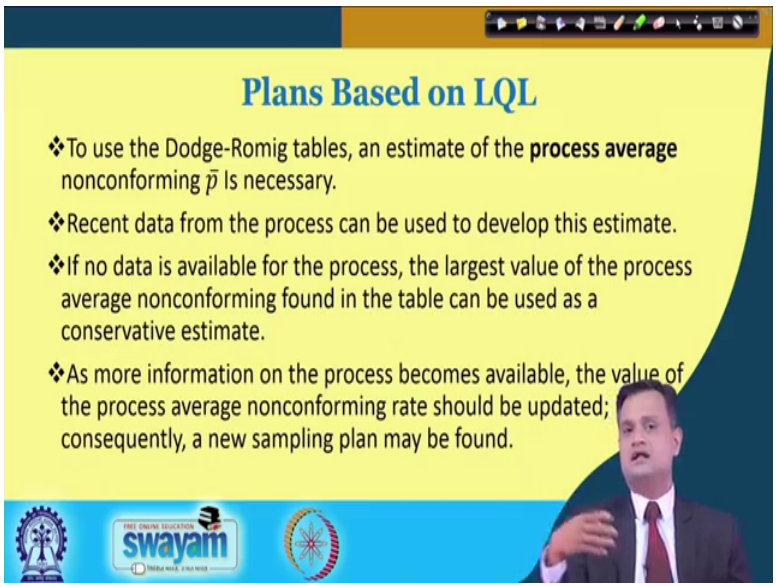

So, with this preliminary understanding if you see how to use the system Dodge Romig system, then I must have an estimate of the process average that is called p bar and you can use the s n data from the process to develop this estimate for a sufficiently longer

period of time, you can collect the data number of nonconforming take the average and you will get the idea. And if no data is available the largest value of the process average nonconforming can be considered as a conservative estimate.

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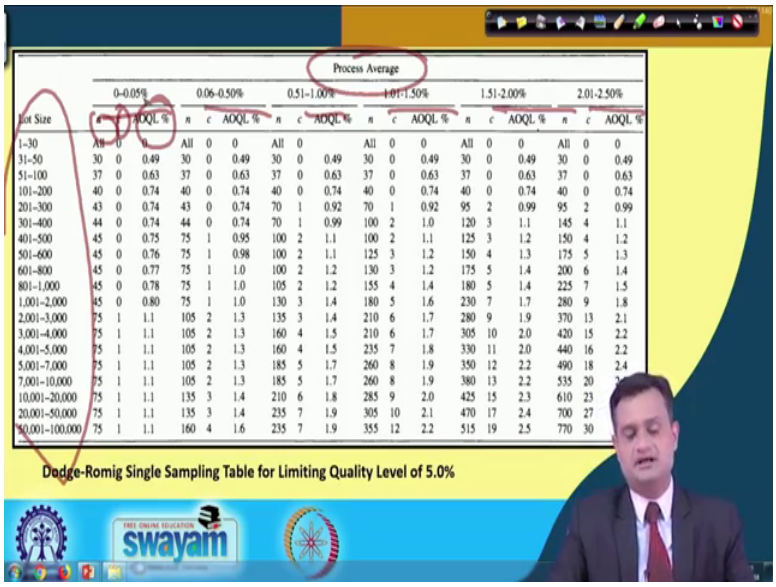

So, now see interestingly how this works? You have the lot size is here, you have say particular process average. So, you can take the p bar or estimate of the process average it is given in the range; it is given in the range and you have n c and AOQL Average Outgoing Quality Limit.

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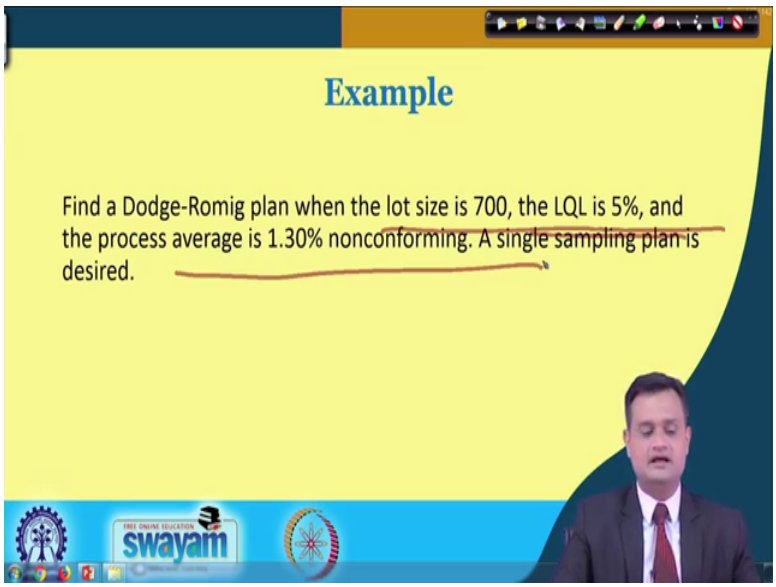

So, if you have to implement this system and also you can see that this particular table is for limiting quality 5 percent. So, for different limiting quality you can have different Dodge Romig tables and you can choose the one as per your LQL level.

So, now if you see the example that I have a lot size of 700 and LQL is 5 percent LQL is 5 percent and the process average is 1.3 percent nonconforming, how can I device a single sampling plan?

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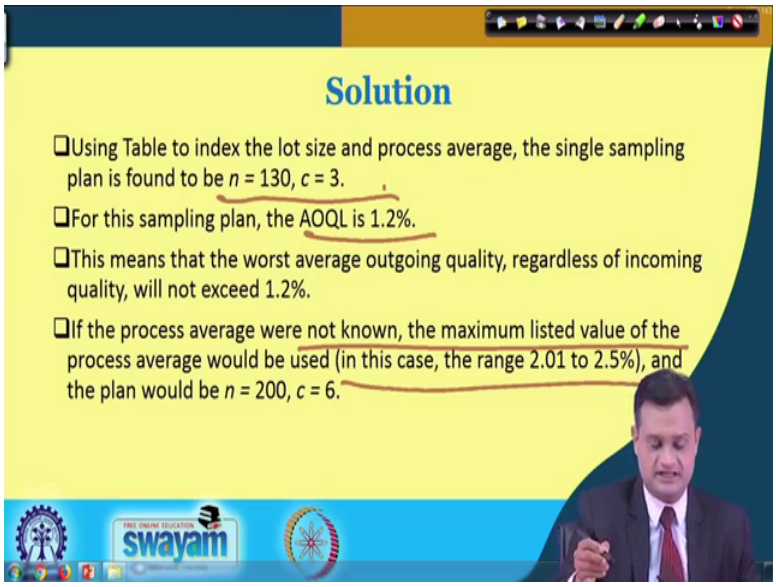

So, I will use the table I have just now shown and I can find a single sampling plan n is equal to 130, c is equal to 3 because I have been given the capital and that is a lot size and AOQL is 1.2 percent. So, the process average were not known the maximum listed value of the process average can be used that is 2.01 to 2.05 percent. So, just see how this is determined. So, I have AOQL 1.2 percent I got n is equal to 100 and 30 and c is equal to 3 and range is 2.01 to 2.5 percent.

So, just see this particular table and this is my 2.01 to 2.5 percent and you can refer the lot size, so let us just see what was the lot size. So, you had the lot size 700 and if I just go back then where this falls. So, 700 will fall in this particular one and you can have n is equal to say 200, c is equal to 6 if you are given the process average then 1 to 1.5 percent it would be 130 and 3.

So, both I have explained that if I have the process average 1.3 percent in that case what I will get is this n is equal to 130 and c is equal to 3. If I do not know the average I will take the maximum value of the process average worst case n is equal to 200 and c is equal to 6.

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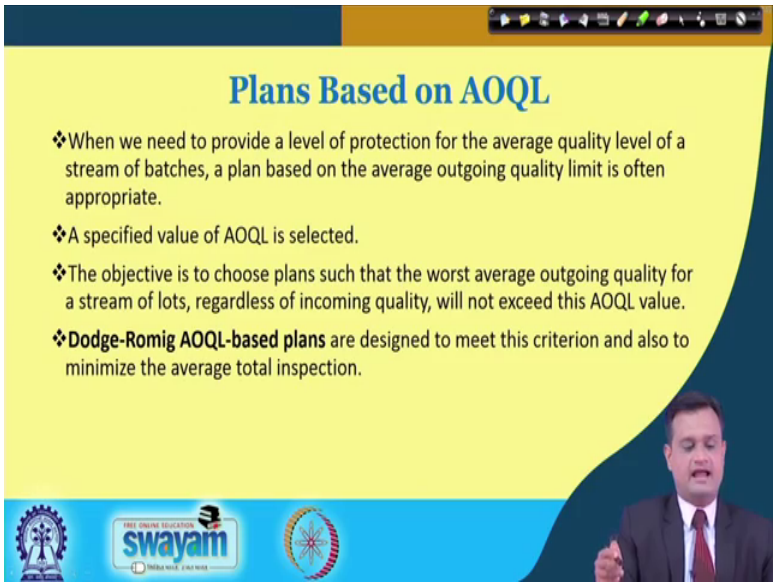

So, easily you can determine this and there are plans based on AOQL. So, Dodge Romig AOQL plans are designed to meet this particular criteria of AOQL and minimize the average total inspection.

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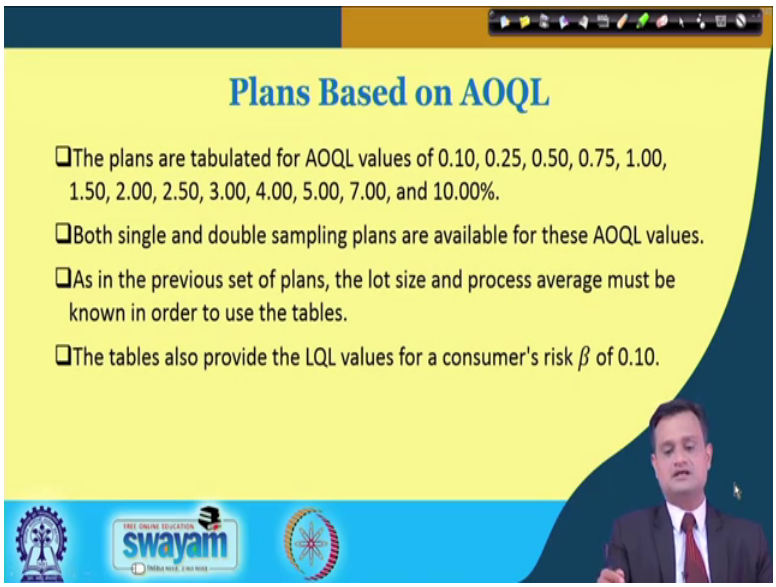

So, you have various plans based on AOQL 0.1, 0.25, 0.5 percent and you can have the tables with LQL also, so this can be seen even here.

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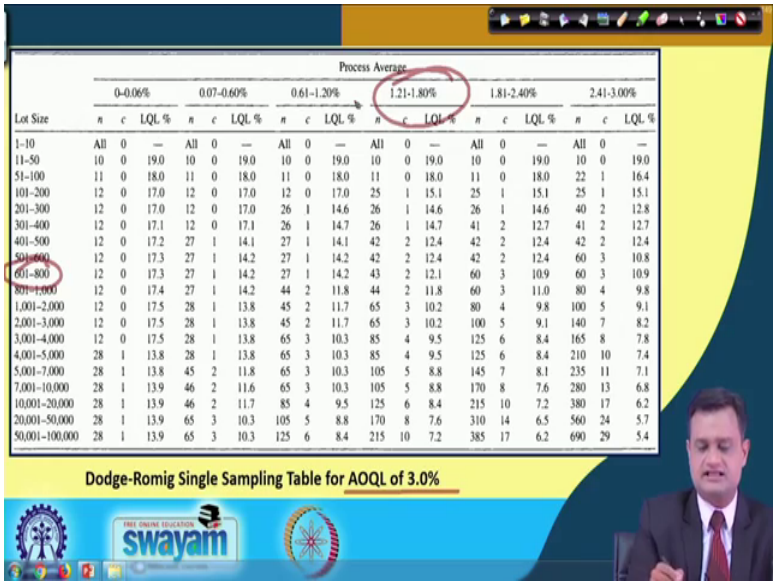

So, previously what you had seen here it was LQL, now this plans are for AOQL. So, you have Dodge Romig plan for say LQL that is limiting quality level as well as you have average outgoing quality level. So, same way you can see the procedure that find determine the range within which your lot size falls also look at the process average and then find the value of n c and LQL.

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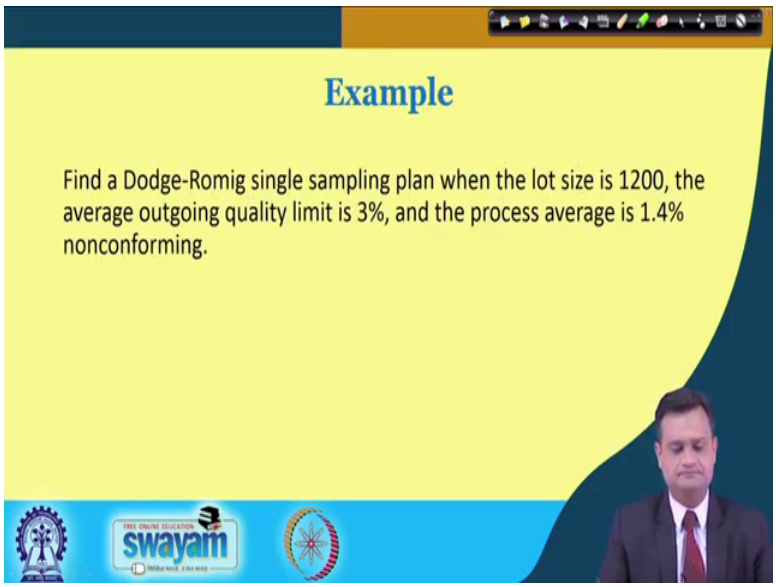

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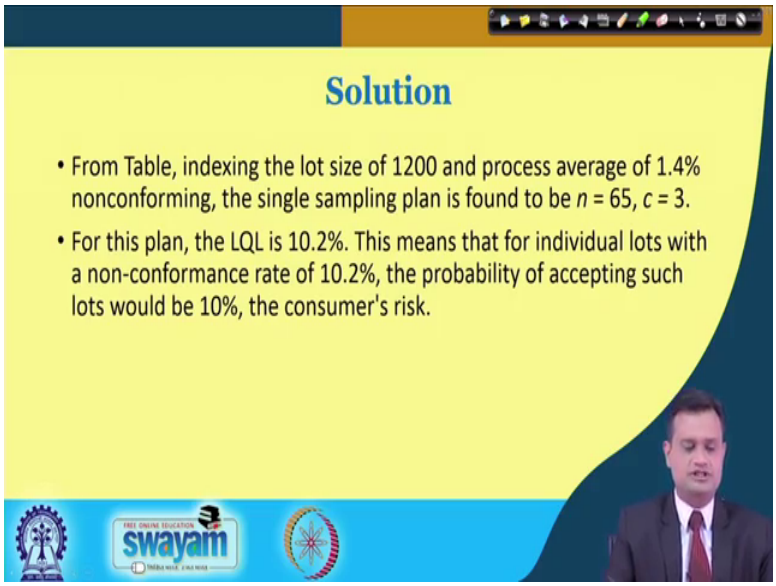

So, your system of finding the plan remain same and I have just put the example you can refer the table and you will get the appropriate plan.

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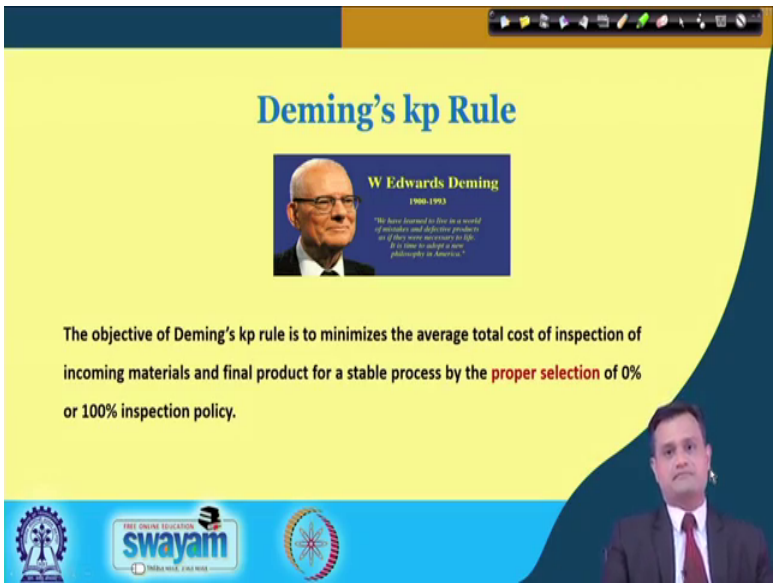

Now, the final say topic we want to discuss in the attribute sampling plan is the kp rule and here the Deming has proposed a kp rule which is little bit different and it tries to basically minimize the average total cost of inspection of incoming material and the final product for a stable process by the proper selection of 0 percent or 100 percent inspection policy.

So, here there are 2 issues; when you want to use the Deming's kp rule to decide about acceptance or rejection of the lot based on sampling, I want to minimize the average total inspection and also I want to consider the final product related cost may be the cost of rework or cost of replacement and may be it's effect on the final performance of the product and I will consider a stable process.

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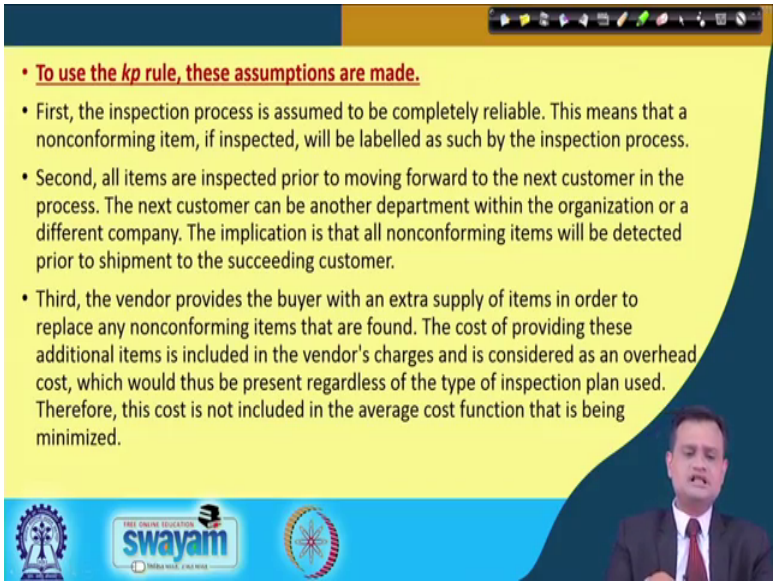

So, to use the kp rules there are certain assumptions that needs to be satisfied that inspection process number 1, inspection process is assumed to be completely reliable. So, this means that if the component is nonconforming it will definitely detect that is nonconforming by the inspection process.

Number 2 all the items are inspected prior to moving forward to the next customer in the process and your next customer may be the next operation in the unit or it may be the final customer. The implication is that all conform a items will be detected prior to shipment to the succeeding customer whether internal or external.

And the third important point is that vendor provides the buyer with an extra supply of items in order to replace any nonconforming items that are found and the cost of providing this additional item in place of nonconforming item is included in the vendor charges and is considered as an over head. So, therefore, here the cost is included in the average cost function that is being minimized.

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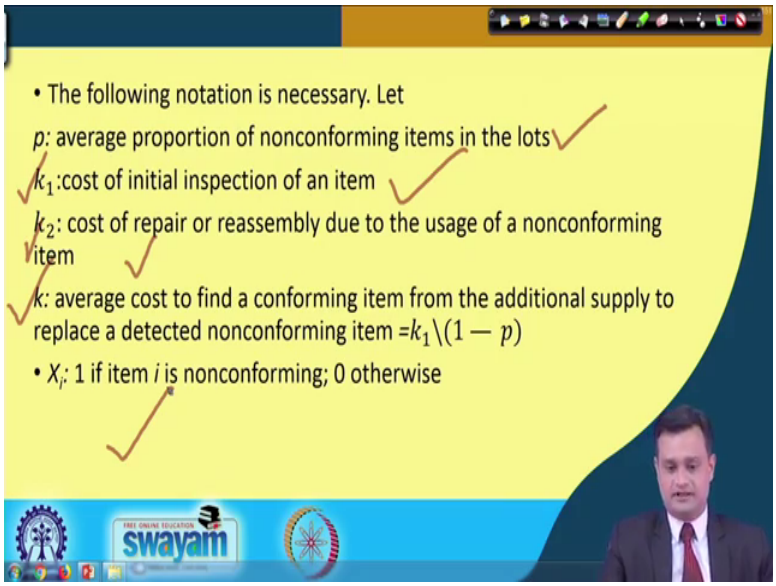

Now, just let us try to appreciate the notations we use in this it is a very simple rule, p is the average proportion of non conforming items in the lots k 1 is the cost of initial inspection of an item. So, consider that item has come you are inspecting a particular lot try taking a sample and you are inspecting the items, so it is the initial inspection cost. K 2 is the cost of repair or reassembly due to the usage of nonconforming item, do you get the idea here.

Now let us say you have fitted the item into the product and because of that either there is a problem in the performance of the product and you need to repair it or let us say you need to reassemble it. So, altogether there is a value addition which is required and this is the component which is something very interesting deming has considered. So, this is my k 2, k 1 is the cost of initial inspection k 2 is the cost of repair or reassembly of the product due to the usage of the say nonconforming item, so this is something which is very special.

K is the average cost to find conforming items from the additional supply to replace a detected nonconforming item. Now see he is also considering the third component k is the average cost of finding a non a conforming item from the additional supply. Now you have found that a particular lot is rejected and number of nonconforming items needs to be replaced by the vendor and this is the additional cost on the side of vendor is a overhead.

Now, vendor will supply a new lot, but again you will not accept it just like that you will inspect it and there would be some cost incurred on the inspection for identifying the confirming item which can be substituted replaced for the nonconforming item in the lot. So, this is really interesting and X i is the 1 if item i is nonconforming 0 if it is conforming. So, once you have understood this terms then the remaining part is just a matter of computation of cost.

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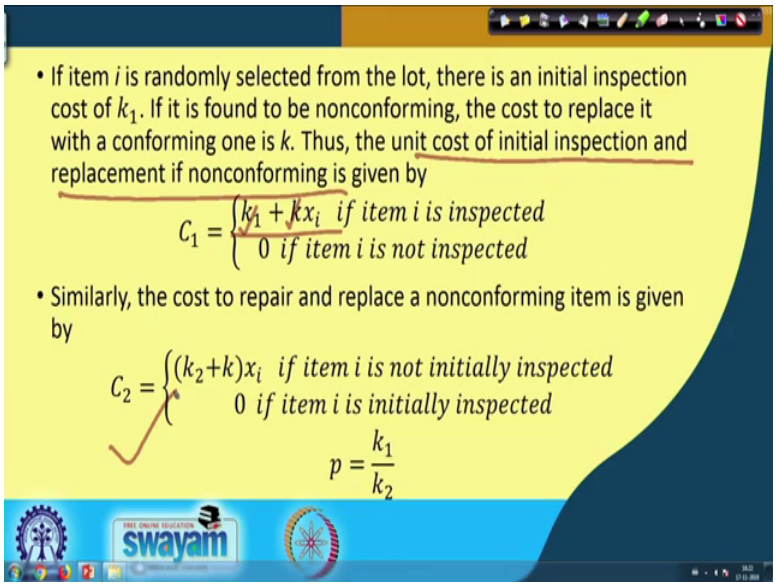

So, I will say the unit cost of initial inspection in the replacement if nonconforming is given. So, C 1 is k 1 plus kx i if item i is inspected and I will say k 1 is the initial cost of inspection, k is the average cost of inspection as I have to identify the conforming item from the lot supplied by this vendor and replace it for the nonconforming item.

And then I have the C 2 that is k 2 plus kx i, so k 2 you know and k is my average cost of inspection multiplied by x i, so I have cost C 2. So, this will become 0 if item i is not inspected, this will become 0 if item i is initially inspected.

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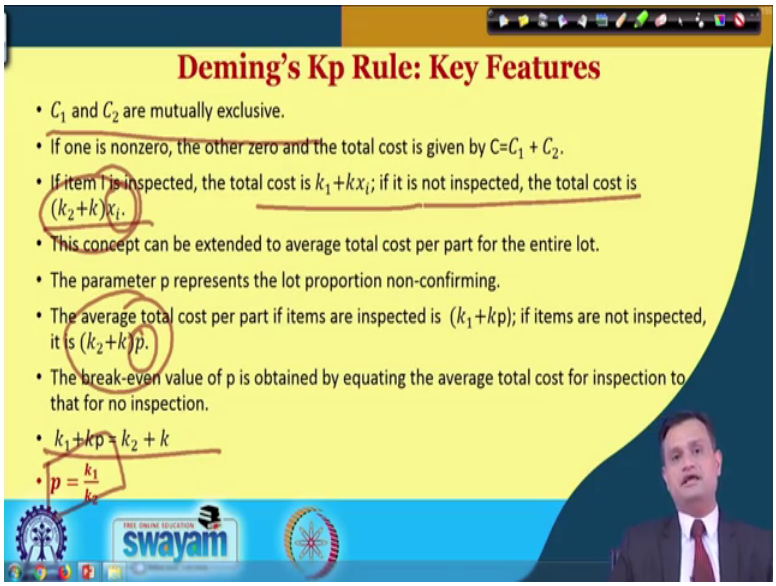

So, now you have p k 1 by k 2 how it is found? Is a very simple system, that you just try to consider C 1 and C 2 they are mutually exclusive and if one is zero other nonzero other is zero the total cost is C is equal to C 1 plus C 2. Now the total cost of inspection k 1 plus kx i we have seen and the total cost if it is not inspected the total cost is k 2 plus kx i, you just try to replace your say x i by p, that is the proportion nonconforming, so you will get now the proper quantity that can be equated and when you equate this you will get the value of p k 1 by k 2.

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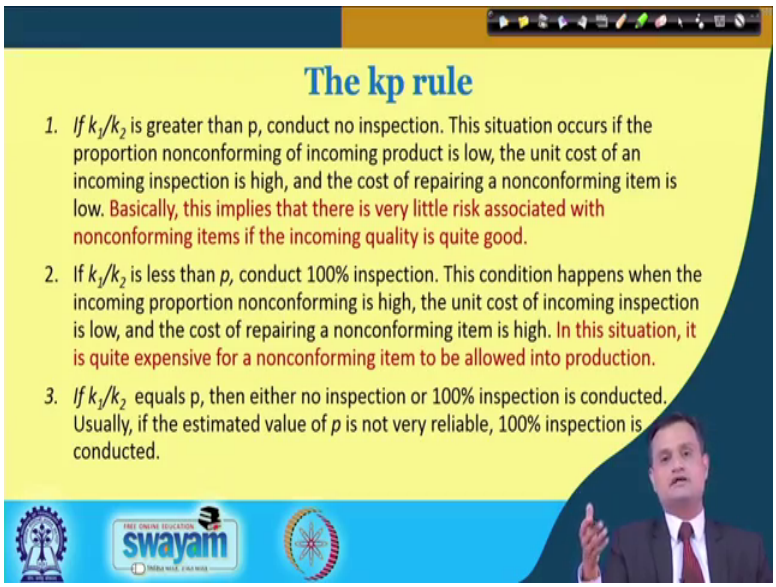

So, once you got this expression you need to follow a very simple rule if k 1 by k 2 is greater than p, conduct no inspection because you have say proportion of nonconforming incoming product is very low and this implies that there is very little risk associated with the nonconforming. K 1 by k 2 is greater than p conduct 100 percent inspection and quite expensive non conforming item to be allowed into the production and k 1 by k 2 equals p then either no inspection or 100 percent inspection.

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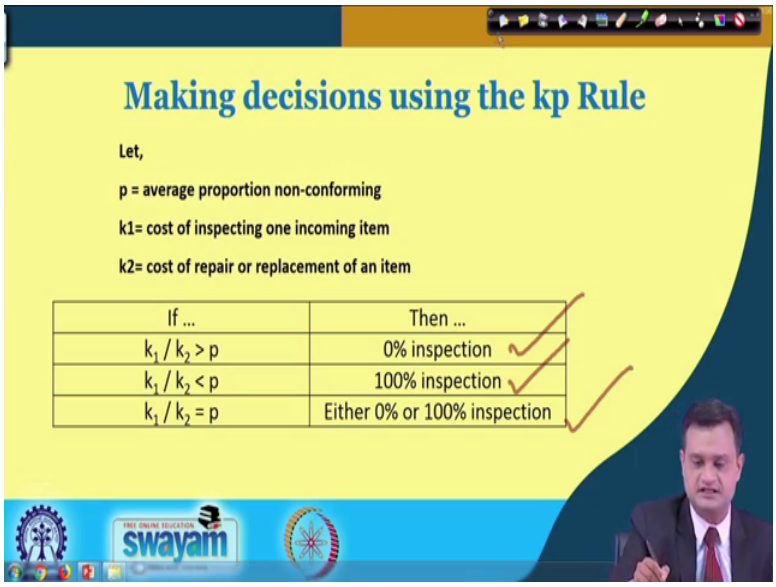

So, this is what I have put in a very simple way greater than p 0 percent inspection, 100 percent inspection, 100 percent inspection, 0 or 100 percent inspection.

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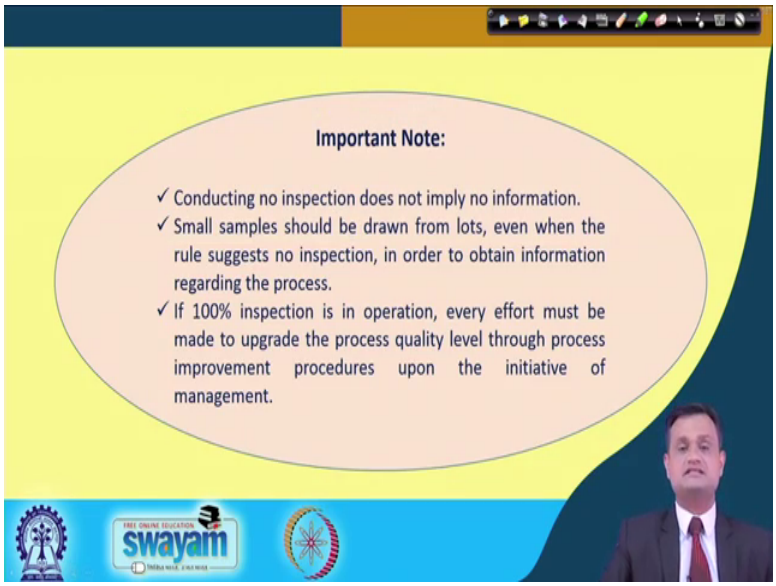

So, I would like to question you before I finish that there is an important note about kp, rule conducting no inspection does not imply no information. You can take the small samples draw from the lots and even when the rules suggest no inspection, in order to obtain the information you can take the sample and develop an idea about the overall say health of the process non conforming items it is producing. If 100 percent inspection is in operation, every effort must be made to update the process quality level through the process improvement, so that you can get rid of so much of cost on the inspection.

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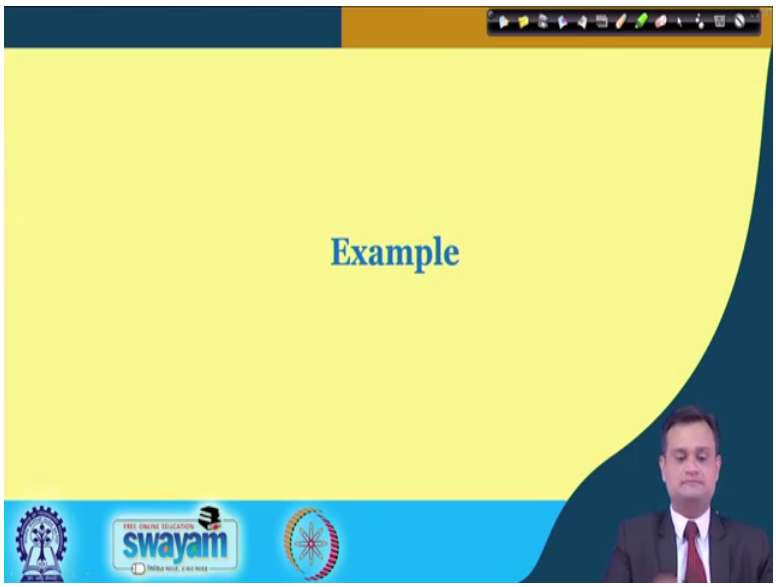

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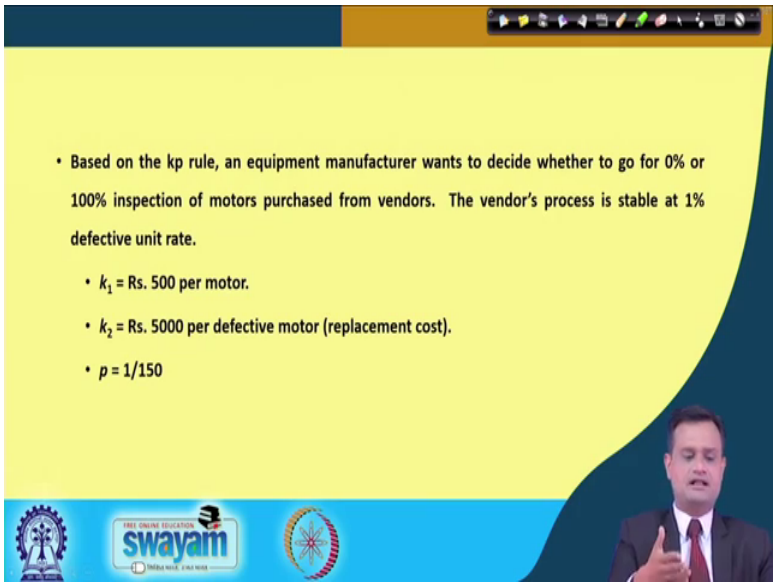

So, this is the example then you can just take the ratio and use the rule to decide about.

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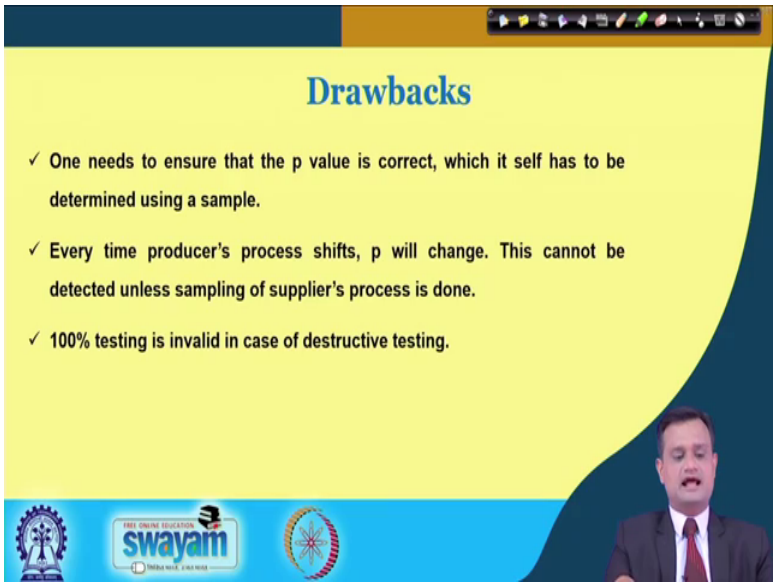

So, there are couple of drawbacks of kp rule that one needs to ensure that p value is correct, which itself has to be determined using a sample and every time produces process shifts there is a shift in the process p will change and this cannot be detected unless sampling of suppliers process is done very important point. 100 percent testing is invalid in case of destructive testing.

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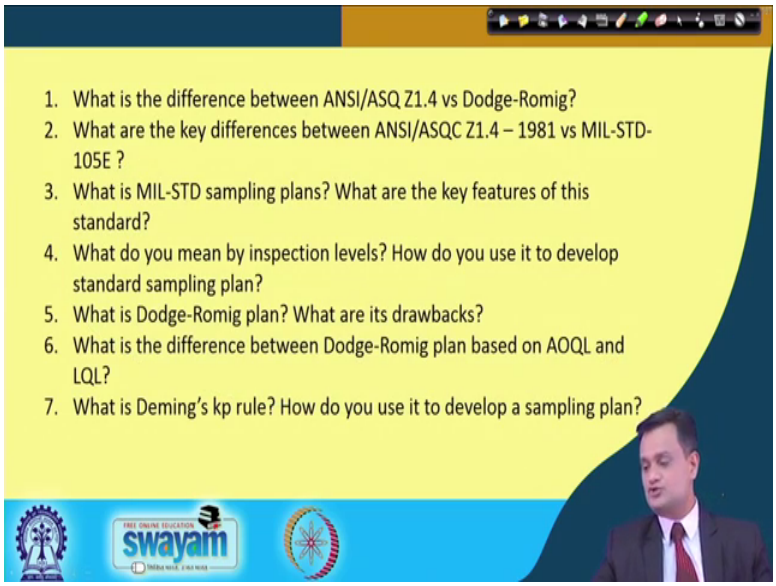

So, before we end as a usual practice just give a thought what is ANSI ASQ standard with respect to Military Standard also what is the difference between Military Standard and Dodge Roming standard? How do you use the kp rule? What are it's advantages drawbacks and what additional information you can draw if you really use the standard plans for acceptance sampling specifically when you have the liberty or when you have the opportunity to switch the inspection level and this kind of say opportunity is not available in any other scheme.

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So, I have used mainly Mitra for this you can also refer the Montgomery.

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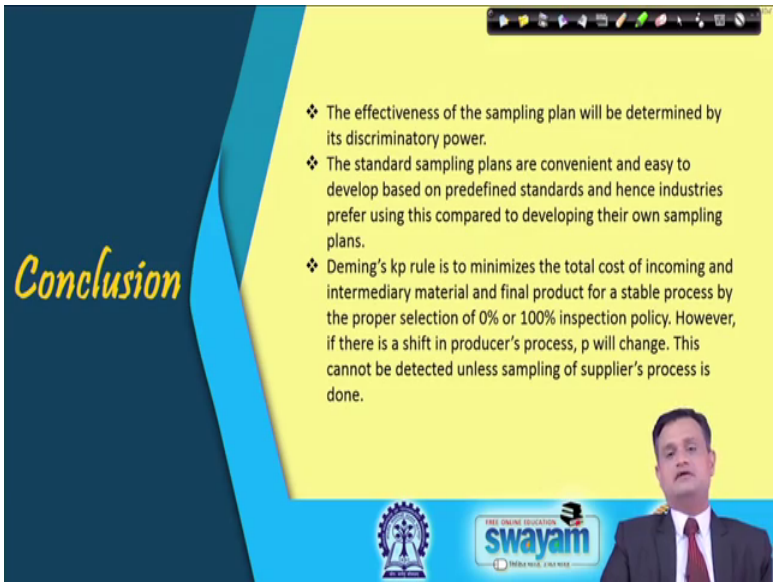

And we have to design a plan which can take care of this stipulated producers and consumers risk and it can offer an appropriate discriminatory power for the given criticality of my quality characteristic. So, thank you very much for your interest in learning this attribute sampling plan or design of plan for attributes and we have gone in detail of the acceptance sampling plan for attributes, keep revising solve your problems in given in the textbook of with or using the real life data and try to get a control over the concept which is very important part of statistical quality control. So, keep revising, introspecting, applying.

Thank you very much, be with me, enjoy.