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ON COLOUR PROCESSING IN INDIA

I can go as far back as 1951, before colour films were made generally. It will be difficult to get the names of the two colour films which were made here prior to when colour processing started in India. One was shot on 16mm Kodak roll, that time there were no other film. Then it was taken abroad, blown up by Technicolor lab to 35mm and regular frames were made by 35mm. I think, if I'm not mistaken, the film was made by Mahboob Khan, and the film was called *Aan*. The other film in colour before we started making films in India in 1951 was *Jhansi Ki Rani*. For that the Technicolor team had come with their special camera where they used the B&W film with a beam splitter and things like that. Besides them one other film was made I think.

Then in 1951, we started processing here. The first film was *Shahenshah*. I think G P Sippy was the producer. Today of course people in the film industry know about colour, temperature, that daylight is different from Tungsten light etc. I remember when the first colour film came... Mr Patel brought that, he was so enthusiastic, there was some match going on, and with out knowing the speed of the film and tungsten or daylight, immediately they just went with the camera and shot. I still remember the colour of the hair; you could never predict what will be.

1951, Ambalal J Patel brought it. In 1952, I came here, and that is the time that I saw some of the film prints of *Shahenshah*. Unfortunately I could never see those earlier matches and what they had done. Then afterwards, of course, it never picked up, because of the cost and considering that cost, the results that they were

getting were not good enough because the industry was not familiar, did not know how to handle these colour films. For us also it was very difficult because we had all the set up, but no work.

Mr A J Patel, our founder, had three good friends in the industry, I think. Homi Wadia, S Mukherjee of Filmalaya, and one more. And he would call them and say, the boys are all sitting, there is no work, I'm getting really disturbed and they would just see through their programme and say `OK, the next one will have a dance sequence in colour'. So, initially apart from *Shahenshah* which was full colour, there were only partly colour movies. Just dance sequence or something like that. This sort of thing went on for three years, then '53 or '54, I don't know the year, Homi Wadia made a full colour film, *Zombo* or *Hatimtai*, one of these two was the first. In those days he made two colour films. Thereafter he made one more. This went on between 1951 to 61-62, these occasional colour movies, partial colour movies. I think '61- 62 there were three releases *Sampoorna Ramayana*, *Ramayan* and *Junglee*.

Junglee changed the trend of the entire industry; between '62 to '71 we had only one colour lab in India and that was Film Centre. '71 to '80-81 one after one new colour labs came up, Gemini started, Reynolds started, Bombay Lab started, Vijaya started. This sort of thing went on for 10-11 years. Then video came in and the number of films went down. I think one after one they started closing down. Star, Mahalakshmi, Bombay Labs are all no more. Reynolds - may be, they will shift, not close down.

In Bangalore - Vasant lab almost closed. Again 3 or 4 more labs have come up there also. Two of them are Govt. owned, so we won’t talk much about

them because they are not really free trade. But Prasad put up a lab in Hyderabad, in Bangalore. I think, this as far as it goes as far as the market size is concerned.

Talking of technology, only about India. Initially, quality wise Mahboob Khan made his *Mother India*, because of his trade mark (the Hammer and Sickle), there was some difficulty - European countries didn't want to print it. Something like that. So, the negatives were processed there, rush prints were being made here. And the final negative went out of India and prints were made in Technicolour. One another earlier film which we didn't talk about was `*Leader*', that was before *Junglee* came in, but it was not totally Indian, it was shot here and printed outside.

Technically, the earlier printers were step printers and there were no additive lamphouses or subtractive lamphouses. There were no colour filters to grade the prints as we do now. So what they used to do is, in the lamphouse in front of the lamp they used to have red, green and blue filters. To change the ratio of these lights, they again used to have grey filters. So, first of all, out of the 100 units of light each filter would only transmit 30. So your 60 is lost, i.e., 2/3 of your light. Then to balance the light you are again adding grey filters, further reducing the light. A reel of 1000ft would take something like 1&1/2hrs to print. This changed about '53 or '54. They removed these filters which were cutting down the light almost 2/3rd and no more grey filters needed to be added.

The next generation of printers were using apertures to control the amount of light and coloured filters to balance the light for good prints. That cut down the printing time from 1&1/2 hrs per reel to about 1/2hr. But it was still very slow compared to what we are doing today. In 1969-70 additive lamphouses were very popular, I think the first additive printer came in to India in 1971, October and I think

we were the first to import. You could print 1000ft negative in 3 minutes instead of 24-25 min. Then of course the race was on, they went on increasing the speed of the printers, etc.

And as far as the printing side, naturally when the printing speed increases you have to have faster processors, so the processors are also matched that.

The other thing was the editing side of things. Earlier editors, like the printers, were not so advanced. They made a lot of noise and very slow comparatively, and were made by only one company, I think, `Moviola' in USA. Then of course, you had this flat bed continuous moving prism, initially by Steenbeck, that took over. As far as editing, I know, with video becoming popular, for most postproduction work today, people prefer to do on video because it is very easy, and you could see your creation almost instantaneously.

As far as lab grading is concerned, when we were using these beam splitters and the grey filters with their ratios of red, green and blue - the manufacturers used to give us screens like you have in the printing industry. You could make 60-screen block (like for printing newspaper), or 120 screen (such as for printing art paper). We had to take photographs of those screens on a very high contrast film, and change from scene to scene. For a film we had to make the complete film like this - maybe 400 scenes – again and again. It used to take days.

It was '52, '53 when this thing was changed and we were using this aperture for light quality. Then it became a little easier. We were asking all the producers to provide us with two frames of each shot. These two frames of each shot were connected, joined and made into a reel which was a representative of the final product. And in the printer we had a provision that we could make colour

correction for every two frames. And after getting the test reel you can see the variation or jumps and for whatever colour balance you want to make, you could just go to that filter band. It used to be a piece of black film with holes and filters. You could just change the size of the holes or change the filter and you are ready in another 20 min. instead of those 1&1/2 day. This went on till '70, '71.

When these additive lamphouses came, video also played its part, and we had colour analysers as we know them today. You just put your negative and see positive image on your monitor, do the corrections with electronic trimmers and things like that, balance your entire film. Instead of making these two frames, `Lilies' as they used to call it, making correction bands, going through trial printing, trial processing, evaluating, again trial printing, trial processing all that was gone. A good grader could sit on the analyser and may be in about 25-20 min he would do grading of one reel. And if the lab standardisation was good, I think the first print they tried should be 96% good, as far as the lab is concerned.

CINEMASCOPE

Immediately after *Jhansi Ki Rani* in '54 or something like that, the first cinemascope film was made. But in cinemascope, they realised that there was one big problem - when you enlarge the image too much you start seeing grains, that means you are losing definition. So the industry was stuck with two things, they wanted the widescreen but the film itself was not able to deliver the quality that was expected. So the first question was how to make the negative bigger.

For the manufacturer, to change their entire system was very difficult, so they came up with a very good idea - instead of running film like vertically in the camera, you run the film horizontally and instead of using four perforations, use

eight perforations. Then while printing you run the positive the same way and you can make a 70mm frame. (Very bulky for the printer, for one kind of film had to move in one way, and the other another way. And also, no contact, printing had to be optical).

Were any camera made like this?

I don't remember the manufacturer's name because we never dealt with those cameras but you can see the manuals, journals on American cinematographers.

Was any film shot in India with that camera?

No. The idea behind those cameras probably was to do away these anamorphic lenses, then there would be no need to squeeze. You can just use your normal lenses, and the definition will be definitely much better. You are not using anamorphic either at the time of shooting or projection, so the results were superb.

But all these things were bulky. The camera was almost 3 times the size of the 35mm camera. So the film manufacturers then played their role to make the film more fine grain so that people can use 35mm film for the ultimate wide screen image. I think the first good film for that sort of use was made 6 years ago now, or may be even less than that. For 5 years before the EXR (Kodak), Fuji had the F series. When the F series was introduced it had very fine grains so that it could be used for this.

So, again the industry has changed and people are using 35mm negative for cinemascope, using the squeezing technique and again blowing it up for the prints. One thing that didn't catch up in India was these wide screen or 70mm prints.

We made a survey on 70mm and realised that two things were very vital - one was that to make a 70mm print, you must have big studios with big 4-tracks. Producers till the end did not have these 4-tracks. So they would try two alternatives then. They would convert the mono-track into a stereo-track, where you are just manipulating your faders and creating some sort of left-right effect, they could probably do some semi-stereo work. At the time of recording I don't think anybody even did that. They used to go with a final mixed track on panpot and try to make two tracks out of it. It was not truly stereo.

And the second thing was theatres. I think that when 70mm became somewhat popular about 4 or 5 theatres, one or two in Delhi, three I think in Bombay, one in Bangalore, are the only ones that set up for it. The theatres used to say that this conversion requires additional investment and our govt. regulations will not allow us to increase the admission rates. So if you're income is not going to go up, how can you afford to invest.

Distributors had the same philosophy. They used to say that if they can get the same revenue out of a print which is costing Rs 45,000 (in those days), why would they then invest in a print costing Rs 2,00,000? Their revenue is going to be the same, may be somebody is very happy and might see the film again, but how many, what percentage of audience will repeat a screening to just look at the film for a second time? The people who are crazy will see it many times any way, whether it is 35mm or 70mm. So that is how the whole thing went and these wide screen didn't catch up. May be now the govt. has changes their laws about the admission rates, things might change. It again takes 3-5 years for the entire industry to gear up.

Is the Geva colour process different from Eastman Colour?

Talking of films, the first colour film was originally a B&W film with a filter layer running along with it and the whole film was a bit of a mosaic. When you shot you were shooting through those filters. You are having a negative image like a four colour block, which you make through red, green and blue filters and you have four separation negatives. Even in block making - simple printing I'm talking about - you take a colour picture and you want to make a print. You go to a block maker who uses separation filters, and they will make three negatives - yellow, magenta and cyan. Then they will make three separate blocks and you will print it three times with 3 different colours.

Same thing Technicolor used to do, there is no difference, except for the metal blocks. The blocks made by Technicolor were on a film consisting of gelatine, not metal, that was the only difference.

This was when the tins were available, the liquid tins, and going much earlier, was - I think this was the trade name - was Dufay colour. In this they used to run the film with a filter mosaic. You shoot through those different filters and you get dots of different repetitions. Make a print, print it again through this filter and you will get some sort of a colour. This didn't catch up, because you couldn't have good resolution, and you had to make a very fine mosaic. This was in 1920 I think, or something like that, before I was born may be! This was when the motion picture industry was just picking up.

Then the next colour film was mostly reversal. I think the pioneer probably were Hansco(?) colour and of course, Kodak, who went on improving a great deal.

Why I'm talking about this reversal film is that our negative film has a drawback - not only in our film, but in the film itself. You see, when you are trying to record a colour image you record them on three different layers and when you are making these three different colours it is not possible to have the rest of the tones on this film. Let me try to explain it. Take any colour, it has 100% sensitivity at one end, say for example, blue at 700 nanometers must be 100% sensitive but it becomes 0 at 600. The green must become 100% sensitive at 600 and become 0 at 500. Red must be 100% sensitive between 500 & 400. This is technically not possible This is not possible as there are no dyes or couplers which have that sort of a response. If you see the response of the emulsion today you will find something like this. So the red image is also recorded in a blue film. The effect of this was - if you can get hold of some good old prints, look at the tree and you will notice that the leaves are never green because the green colour has been exposed on the blue layer also. The sky was never blue because it had been exposed on the green layer also. When you are using a reversal film, you are using the same three layers, but what is happening is, the same film is being reversed so when you are making a negative image, you have some sort of distortion and the you reverse it and you also have a distortion which is like that. So it cancels totally. But this is not in negative film.

Of course our negative films are as good as reversal films, and why is that? Let me explain.

So you have this unwanted absorption in a wrong emulsion. Therefore they introduced what we know as a mask. This mask is inversely proportional to the unwanted colour, so it cancels. This technique of introducing the mask was not developed at the Geva factory, since you mention Geva Colour, till about the year that `*Ganga Ki Lahren*' was made. Geva colour films were not the only films for that matter, there were many others. Ferania(?) colour was made in France, Geva

colour was made in Belgium, Agfa colour made in Germany. It was only Eastman Kodak film that first used to come with the mask, originally a single mask, which subsequently became a double mask. This is not a layer in the film. What the mask does is that since in the blue layer all the light will come, the only thing they can do is restrict the sensitivity of that layer. So they just have blue sensitive layer, which when developed will generate a yellow image. Then the next one is a yellow filter. So the blue light does not go through that, then you are left with green and red. So the second layer is a green sensitive layer.

The earlier one was only yellow mask. Then they went further, and also found a way to introduce a red mask, so the present day film looks orange - because it has a yellow mask and as well as a red mask. To take care of the two overlaying portions.

You were talking about Geva colour. If you happen to see the archives, the films that were made before 1954 on Geva colour, you will probably see the difference particularly when you see the shadow portions, which used to be brownish (like tan) in the outdoors, and as I told you trees were never green. Although even in those days it was possible it better by going through intermediate steps, and an inter-negative. You could make a four-colour separation from the original Geva colour negative, and could make a mask to take care of those unwanted absorptions, then make a negative once again from these four different separation negatives. Yellow, magenta, cyan and the correction mask. You make an inter-positive or inter-negative with the help of these four instead of just three. The 4th one is automatically correcting the errors. The first film that was made with this process around 1954, '*Mayur Pankh'* that was the first Indian film processed with this correcting mask. If you happen to get a print in the archive you will see the difference.

Then of course when '*Ganga Ki Lahren'* was made Geva colour was available with the mask. The only difference in those years was speed. Probably Kodak was able to supply 80ASA, then 50 and you can imagine the state of the artist, two and half times more light, so that much more heat was generated for the producer, they must have more generators or more electricity. So many more light boys to handle and it multiplies.

You mentioned hand coloured prints also.

Yes, these used to be called Bori colours. These prints were made after a B&W print had been made. This used to be chemically converted into a sepia print, because sepia colour resembles our skin more or less. And there were experts who could really take a brush and tint the film frame by frame. General thing was they could patch up big areas, if there was a long shot of about 200 people, they couldn't possibly put colour to each face. It was quite popular.

Was it done here?

It was a cottage industry. The labs used to take out a print, it used to go to artists wherever they were, they would sit with a rewinder, and I think it was mostly young ladies who were doing these jobs. Bori colour probably because the Bora community must have been involved in it. I can't say that for sure. If you go back to these crafts of India, you know, there some areas where you find this fine art is there because there is nothing else for them to do except concentrate in these smaller things. Probably this is how the name must have developed.

So it was being done in India?

Yes very much so.

In the early days when colour came in, you said cameramen had lot of problems adjusting because B&W filmmaking had certain specifications.

You make a film more sensitive and increase the grain size, then you are getting better speed but at the cost of the grain. To strike a balance and to get an acceptable image you have to restrict yourself to a particular speed, depending upon the technical developments of that time.

The early colour film that I remember was I think 16ASA, while B/W had already reached 80 ASA. And of course it was very difficult to use this slow film because particularly when you are shooting indoors you need a lot of light. So there has always been development and research and this research process never stops. They continuously try to reduce grain size and make the film more and more fine grain. When they succeed in getting fined grain compare to the earlier one and at a better speed, then a new product is always announced.

For example, today we have upto 3200ASA in colour films. Of course in 3200 there is a little bit of sacrifice of the image quality because they make the speed double by using some internal reflections within the emulsion. Otherwise there is 800ASA without any such thing, you can have a very crisp image with that. Not in the motion picture film yet, motion picture film is till 500 ASA..

And of course, this process of research which never stops did do breakthroughs by some risky innovations sometimes. When they came to the speed limit it was not possible to have all the characteristics of finer grain and higher speed all in the same emulsion. So what they do was to have multiple layers (because one emulsion can't have it all). So they had two layers in blue. One to take care of the finer grain and slower speed, and other one for high speed and high grain.

Medium speed, medium grain, high speed, high grain and low speed, low grain. Then they realised that instead of having these emulsion layers overlapping each other it may be better if there could be speed. That is how the generation of Fuji super F series or the Kodak EXR series came. Instead of having layers like that the centre layer remains, the high end layer is shifted little bit to the side, low end layer shifted a little to the side as well, so now you have an extended range.

When colour first came in how did cameramen here respond? What kind of difficulties did they have?

That is not related to film or colour film at all. It is a general phenomenon. When new things are announced naturally the consumers, the users, are not fully familiar. So they keep experimenting. Initially they go by the guidelines given by the manufacturer. Say for example, when colour films were announced, manufacturers used to say that the lighting contrast should not be more than 1:2, extreme 1:3. That is the starting point. When you are making a B&W film you are producing every thing only in the shades of grey, so your separation in the image comes only because of the destiny of the image, nothing else. So, you had to create a dramatic effect, had to increase the contrast by the lighting ratio or the direction of the light etc.

In colour, the colour itself helps you to give separation. And the initial films because of the lack of these masks were very contrasty, very hard. So the manufacturers used to give that basic guideline that the light ratios between the fill and the key should not be more than 1:2, in the extreme cases 1:3, and that was the starting point.

Today we see cameramen using higher contrast than that in the lights, and that is the matter of little bit of experimenting - you get used to a particular medium of expression. Except for that, if you really want to be very critical about it, although colour films are supposed to be sensitive to the visible spectrum, say between 700 and 400 nanometres, if you see the average visual density of a reproduced image, you never get a straight line. It will be... there will be some flaws at the cross over point. Because the emulsion layer sensitivity is like that, here you happen to get a little loss.

What really happens is, unfortunately I think, every art director is not familiar with that sort of phenomenon. He will construct a set which he will probably paint with a colour which to him looks very good, and he thinks producer will like. Probably photographically you can end sometimes up having a colour which will not reproduce so well. The blame will fall on the cameraman because he comes to the set, takes a incident light meter, says OK key is 100fc, good, fill in 84fc, good, according to the tables the average here is f5.6. He does the shooting. In the results the faces look all right but look at the set – gone! Why? Because the reflectance from the set is in that colour spectrum which cannot be recorded very well.

Unfortunately it happens this way here because the art directors don't go through a course of cinematography or the way colour films are made, how they should be used. Take for example the costume director. I'm sure nobody has ever taken a piece of cloth and seen where does it fall in the characteristics curve of a filmstock.

Manufacturers do say that how things have to be taken care of if everybody is using a reflected light meter (that means you are relying on the fact that when the light is of a specific value, then every thing else on the set is also

within permitted guidelines). And in those guidelines, the darkest area in the set must have about 3% reflectance, and the white should not exceed 96%. And the same thing applies to the make up. If you ever see original Max Factor catalogues you will how many shades they make, and I hope the industry is today using all these things, otherwise it will be like the really funny case in "*Ganga Ki Lahren*". In that film the main character, Dharmendra I think, was very well made up, but to the supporting artiste's face the makeup man just gave a coat of some talcum powder - visually OK for society scenarios, but for film work horrible!

So, you see the two faces in the same frame, they are looking wildly different in colour because this talcum contains an optical brightener to make you look white. If you are see this character in a separate shot then he looks OK, see Dharmendra alone, he looks fine, but together in the same frame Dharmendra looks like he has one skin colour and other person has completely another skin colour!

Because like film industry abroad is taken as an industry, people do sit down and discuss, and every body comes out with their problems. Probably the costume director will show the materials and the cameraman can then possibly say, no, this is not acceptable. Here the cameraman goes at the last minute – actually everybody comes at the last minute. Somehow they finish their job and go home. Because the film belongs to nobody. The producer is just making the film, he is not investing, he has put in no other money other than the financer's money, he only shoots when he gets the instalment. For this reason sometimes the film also gets very delayed. A film is nobody's property. If for the producer it is his own creation he would like to preserve it, but here nobody bothers. The film is ready, dates are fixed, and everybody is waiting for the money to come ...

If the censors put in some objection, till the last moment the certificate will not have come. If Friday is the release day, till the previous night the certificate will not have come. Prints must leave the lab by Monday or Tuesday to reach by Friday. So lab has only 3 days, Sunday is a holiday. In three days the lab has to take out 200 prints, which is nearly impossible. This results in a lack of time to see anything, whatever comes has to be taken and in that hurry the negative gets mishandled, damaged. Nobody makes a dupe. A dupe is made for perpetual preservation, so you don't use your original negative. Here situation is just the reverse, if the picture clicks then they are worried, negative is overused, how will you get 400 prints. Then they try to get a good print out of the 200 prints which can be used to make a dupe negative. It may not be a 100% good print, but that is the best print out of the 200. By this time the good positive itself has been used in so many screenings…

In Hollywood, the original negative is never cut. Here, to be more economical, the first thing they do - as soon as the negative is processed - they want to start cutting it. Take out the OK shoots make a print only of those, and that is how it starts. There it is not like that. There, as we read it, they process the negative, make a print into a tape and the negative goes into storage. It is never touched after that. When the final edit is done, then they give instructions that out of reel one we only want to use 20ft (the specific 20 feet that would be in the final film). So the dupe film will be made of that 20ft. Or if the producer wants to have a choice, he may like to make dupe of the whole negative. Otherwise the original thing is never touched.

Was there any work done earlier to make processing machines in India?

Except for one lab, all other labs in India use Indian made processing machines. We at Film centre from day one have never imported a processing machine.

In those years import restrictions were a big problem. When the colour film industry started in 1952, there were no import restrictions but by the time the industry picked up in 1957 import restrictions had come in.

Actually the govt. had no money to allow us to import; there was no choice. Processing machines do not need that level of technology compared to what is required in making printing machines. So with available technology it was possible to make processing machines, and we are used to making them in-house and do not even buy from the outside. This is because since the chemicals are corrosive, the life of the machine is hardly about 3 or 3 1/2 years. Suppose we have 3 machines set-up every year one machine has to be changed. So we are continuously manufacturing machines also. That is done almost everywhere. There was one manufacturer, Krishnagopal (KG), he used to make processing machines.

Printers, I won't talk about! When the govt. announced tax benefits for research and all, some people made some third rate things – I read that somebody had made a printer. No, I do not believe that it was possible. When a thing is manufactured for selling, the first requirement of the manufacturer is to know how much the consumer will pay - the maximum price, and the 2nd thing he wants to know, as a manufacturer, is the demand quantity wise. If I have to make a good printer, it will cost Rs 20 lakhs and I can sell only a total of about 20. Total revenue is Rs20 lakhs X20. Then there is the whole question of the high level of research that has to go into it… I don't accept such a thing. I don't believe that it was made here.

Japan today is pioneering in the camera industry and every month they produce one camera, i.e., the research is continuously going on but they know that they are going to make 10 lakh pieces, so the research cost is divided into 10 lakhs.

Tell us about the state of labs in India.

They are not in a very bad state. And if you go by numbers, there are so many major labs. In Bombay itself you have Film centre, Ad lab, Reynolds, Cinelab. Film Centre, Ad lab are very major labs. Madras has 3 major labs - Prasad, Vijay and Gemini. In Hyderabad there is one regular one and other govt. labs.

We, Kodak and Fuji together, do periodic surveys of the conditions that exist in the lab. The picture is not bad. These major labs - most of the time their processing is excellent. Some time the situation is beyond our control. Say, for example, the manufacturer sends you a test, it happens to arrive at the airport on Friday evening, then Saturday, Sunday you can't get it out. On Monday morning the postal department has four days of post to go through. Sometimes it takes 20 days for the test to arrive to the processing lab. In those 20 days, depending on how it was handled, where it was lying down (even in sunlight) - sometime the image can go bad before the lab even receives the test, and this is reflected in the final results they get.

I'm not talking of smaller labs here - they have constrains. Let me explain. The first requirement of good quality, if you have to be within normal cost limits, is that you have to process 40% of your installed capacity. If they don't do that, the chemicals, which are in the tank, are deteriorating every minute. In about 3 days it's no good for use. If they do 40% work every day then the chemicals are being replaced every day continuously.