Les Misérables

A new movie version of the classic musical Les Misérables, directed by Tom Hooper, delivers the perfect performance direct from the sound stage. Simon Hayes (Production Mixer) and Gerard McCann (Supervising Music Editor), together with the rest of the crew, were instrumental in realising a studio-quality musical soundtrack from a live production recording. Hayes and McCann gave Alistair McGhee their take on the project.

Simon Hayes: "The genesis of the project lies with Tom Hooper, the Director, and his desire to shoot *Les Misérables* live; he wanted to capture the original performances from his cast on the set without relying on the normal approach of pre-recording all the songs, and he didn't want to do any ADR afterwards. For him, a live shoot offered a truth and energy that just wasn't possible using traditional pre-records and miming or re-recording performances in ADR. In our first meeting he said to me: 'Simon, I know that technology has moved forward a long way in the last few years; I don't know the details but I want you to use that technology to deliver a musical where the performances are sung live by the cast. That statement became instrumental to the way the sound and music department planned our workflow.

Gerard McCann: "The traditional approach is that the orchestration and the vocals are done first in the music studio. The music team works in isolation from the sound team weeks or months before filming – in some cases actors in the studio are singing alone, their performance to be edited in alongside other actors in the same scene.

"This is a process very, very different to a live stage show or the live direction of actors on set. So you really are talking about a radically different approach.

"In that traditional format, all of the sung material has been recorded by the time you come to shooting. At that point the cast comes on set and they lip sync to their pre-recorded performances, much like shooting a pop video. The music editor's role on set in that scenario would be to play back the songs, and monitor the accuracy of the actors' lip-sync."

Hayes: "And that would have been the case for the whole of *Les Mis* had it been mimed, because there are only a handful of lines of straight dialogue in the entire film. Everything else is sung."

McCann: "...So as a director that traditional workflow commits you to performances recorded 'cold' in the studio, perhaps months in advance, and that wasn't what Tom Hooper wanted. He wanted to direct the film on set in the same way he would direct a dialogue-based drama, getting the best possible performances from the actors in the context of the scene and the emotional intensity of a live performance, interacting with their co-actors, rather than merely lip syncing to playback. However, the magnitude of difference of doing it live meant that early on in the project we did hear people outside of the production team say, "this is impossible" - they questioned how we would be able to capture free-timed, live vocal performances of a sufficiently high standard on location, take after take, but also be able to construct a musically coherent edit in post and add a live orchestral accompaniment to it later.

Hayes: "To achieve a live musical recorded purely on boom microphones would have required single camera shooting. Of course, when Tom was planning the cinematography on the movie he had to be sure that if a 'perfect take' was performed we would have it in the can on various angles and sizes. He decided the only way to capture the perfect take live on location would be to shoot multiple cameras – we just couldn't afford to miss it. That meant there would be lots of shots when we just couldn't get the boom mics close enough to capture the live vocals. And in turn that meant we would have to rely more heavily than usual on wireless systems using lavalier microphones."

On-Set Solutions

Hayes: "There are three major obstacles to using such systems: radio performance in terms of range and quality, the absolute quality of the mics themselves, and the problems of fixing the mics physically in places that will deliver good sound, free from clothing rustle without

visually impairing the shot.

"I had to tackle each of these problems in order to design a workflow that would reliably deliver audio of a quality that the music department in post could work with, and Tom was totally committed to and supportive of that process. First we settled on Lectrosonics digital hybrid radio mics, and taking advantage of the temporary window of availability of channel 69 and 38 we were able, with careful frequency planning, to field 26 channels of radio without intermodulation issues and free from range and signal strength issues that used to plague the use of wireless on the set.

"One of my main aims was to deliver as natural a dynamic range as possible. We agreed that there would be no compressor/limiters used in the Production Sound recording chain,allowing the Music Department in post to use the full 24-bit dynamic range available to them, which again really helps with keeping performances sounding natural.The Lectrosonics were used at a low enough gain level that their limiters never cut in.That is very impressive because usually with film industry radio mics you need quite a lot of signal to noise to avoid hearing radio artefacts, and the way most companies achieve this is by using limiters on their radio mics, which allow them to keep the levels higher without hearing any distortion. Well,we tested the Lectros at lower gain levels and found they were capable of transmitting transparent, accurate vocals without ever touching their limiters.

"So there were no limiters in the mics, radio transmitters, mixers, or recorders on the set of *Les Miserables*. Every vocal was captured in full dynamic range and without any EQ either, which was another agreement between myself and the music department during planning. Full bandwidth vocals with no 'on set' EQ. Again,this is following Tom Hooper's ethos that he wanted performances to sound natural and real.

"Secondly, we did a lot of sessions at Abbey Road comparing the sound from our location mics against the sort of quality studio mics that would be used in a traditional recording session for a musical. The boom microphones that we chose, that were employed by two of our boom operators at all times, were the digital Schoeps SuperCMITs. These microphones are very new and use DSP noise cancelling technology to reject off-axis background noise.

"Using the SuperCMIT requires boom ops of the very highest calibre because as soon as you lose a bit of accuracy the DSP will be rejecting your dialogue as 'off-axis' sound, and so I really rely on the quality of my boom ops to deliver. My boom operators have been working with me since my first movie and I consider them the very best at what they do. We are a team and always work together.

"When the Schoeps were used on *Les Misérables* it became clear that if they were in an optimum position they could compete on a level playing field with the music studio mics at capturing high quality vocals.

"My third Boom Operator used a Neumann RSM 191 Stereo mic at all times, set to record M&S Stereo, and his primary objective was to add width and balance to the choruses while the other two boom operators focused on the solos.

"We also used some 'planted' Schoeps MK41 hyper cardioid capsules, sometimes in the ceilings of carriages and other places that we needed something of high quality and low profile to hide."

Personal Service

Hayes: "...However, it was the notion of using lavaliers for large amounts of the singing that was controversial. I was confident the DPA 4071 personal mic was the right solution, having come across the DPAs while working on *Mamma Mia*. There was a song in the film that Meryl Streep wanted to record singing live, and in discussion with Benny Andersson and his longtime engineer Bernard Lohr they told me that having tried every lavalier on the market to try and achieve studio quality vocals on the stage version of *Mamma Mia*, they had finally arrived at DPA. This they considered to be the only microphone that could provide them with comparable quality to that achievable in a music studio.

"When judging different lavaliers up until that point, I had always considered the differences in sound to be a matter of taste rather than a clear cut situation of one brand being superior. That was until I listened to a DPA up against the competition. In my opinion the DPA is simply better, more open sounding, less chesty, and it matches a boom mic more closely than any other lavalier I have heard. I did a demo of the DPAs at Abbey Road specifically for *Les Misérables,* and the engineers there, despite initial scepticism, were suitably impressed... They felt they were getting approximately sixty percent of the quality offered by a Neumann U87, when I think they were expecting maybe twenty to thirty percent. Considering a U87 is placed in the optimum position on a stand in front of the talent's mouth and the DPAs were placed on the performer's chest, I think this result is suitably impressive. As a bonus, these mics can handle very high SPL levels from vocals without the onset of

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Simon Hayes, Production Mixer.

harshness or hardness as they approach their maximum SPL, and at the other end of the scale they are also sensitive enough to faithfully reproduce the smallest 'breathed' vocal, such is their dynamic range.

"And finally mic positioning... We had to have prime positioning for the mics, and that meant outside the costumes and on the solar plexus. With fantastic cooperation and collaboration from Costume Designer Paco Delgado and his amazing costume department, we were able to do this, getting our mics in prime positions and disguising their tiny plastic mounts with off-cuts of each costume material so the mics were in open air and never under fabric, but were disguised. In terms of visibility the mics wouldn't be in shot on close ups, and with a bit of sleight of hand would be all but invisible in the wides – which just left the mid shots. There we relied on the ability to 'paint' them out in post production. So whereas at the end of a normal filming project the post production team sit down and have an ADR spotting session, for *Les Mis* they had a mic spotting session where it was identified which mics were visible and had to be painted out in post."

McCann: "Here was the risk of committing the 'ultimate folly' on *Les Mis*. We were committed to the post production costs of painting out the mics, but if we got it wrong on set and had to shoot ADR as well, we would have incurred significant extra costs as well as potentially damaging the performances. That might have called into question the whole idea of doing the musical live. And that was just one of the reasons why the 'i' word was bandied around a bit at the beginning of the project. Was what we were attempting 'impossible'? ...On top of the issues of intrinsic noisiness of the process of filming a production like this on the scale that we were attempting.

"What was really great was the sense of being one team, where everyone on the set recognised that what we were attempting required the buy-in of everyone in a much more cohesive way that is perhaps normal in film making."

A Dicky Stage

Hayes: "Scale was one of the key questions. We didn't actually have a sound stage big enough to stage the Paris street scenes. Tom asked me whether i would prefer to shoot the exterior Paris street scenes on location or on a sound stage, but with the long length of the scenes and Tom wanting to shoot them from start to finish without cutting, shooting exteriors was just not possible in Britain with aircraft noise.When we started the project the only interior stage big enough would be the 007 stage at Pinewood, and the acoustics there are really problematic as it is not a sound stage. The same would be true for any big warehouse space. But a new facility was being built at Pinewood – the Richard Attenborough Stage – which was absolutely vital to staging the big set pieces for *Les Mis*. The stage is about 30,000 square feet, and Eve Stewert, the designer, had used every inch of it.

"Early on in discussions with Eve, she asked me if there were any ways her set design could help with Tom's vision of a live musical. I commented that if we were recording live sound, we wanted reality; if they are in shot, the cobbles should be real cobbles, the oak door frames should be real oak door frames. But of course, that only holds for what the camera actually sees in shot; outside that we need to try and make the set and the crew disappear in sonic terms. A good example of this was our decision to put rubber shoes on all the horses' hooves.

"In the scene where Éponine (Samantha Barks) is singing in the rain, first we worked with the special effects department to get the best possible rain that will show up on camera but not drown the mics or make too much noise when striking the set. Samantha was wearing two radios that were changed for every take – we didn't want any failures due to moisture, or any degradation in the sound from drowning capsules.

"After every take the wet ones were placed on a carousel with a hair drier to make sure we had plenty of dry spares. And then every piece of set that you can't see, every roof top and every piece of floor out of shot, was covered with rubberised horse hair to deaden the rain hitting it,we had a truck load of horse hair delivered to pinewood. Then the camera had a horse hair roof to deaden the sound of water droplets striking the polythene cover. The camera department were wearing black 'bolton' fabric ponchos over their wet weather gear to 'soak up' the sound of the water hitting them.The boom, which was actually the track used in the finished movie, would have a second boom operator shadowing it with a little roof on the end of his boom pole to shield the first boom operators mic from water droplets. That's the level of detail we were aiming at that became possible due to a fantastic seven-man sound team. As soon as we didn't see feet in shot, the sound team were carpeting the set and lifting that carpet as soon as a shot was finished, so that we were never holding up the shooting. We were deploying every trick in the book to keep the set as quiet as possible.We had other ground breaking techniques to allow us to record live singing on set,one of them was 'silent wind' which was the placement of the wind machines for moving the performers' hair and costumes on the sound stage to make it appear they were on an exterior. Wind on movie sets usually leads to ADR, but with careful planning with the special FX team we placed the wind machines outside the sound stage and piped in the wind through flexible air conditioning hoses so the mics would not pick up the electric motor noise of the fans at all, just the sound of air moving – which actually sounded like real wind, just air moving at a frequency higher than the human voice that could be removed in post without affecting the live recordings.

Man With A Van

McCann: "The music department had a mobile set-up in the back of a Luton van, which was our roving home on location. Here we had our live piano performing and three Pro Tools systems, operated by music editors Rob Houston, John Warhurst and myself. Roger Davison and Jennifer Whyte had the very unusual task of being 'on set' pianists, providing live accompaniment for the singing, which they followed on video monitors with a live feed of the vocals. Simon was able to route that live piano feed into earpieces worn by the actors who were then able to sing to live accompaniment. Our Pro Tools systems had three roles: one was dedicated to playback for tracks that required a fixed tempo, like chorus material. For the larger crowd songs, we would record a rehearsal of the ensemble cast on set on the day, and use that as a playback for shooting, so that the crowd could follow along singing in the correct tempo, and this live singing recorded by Simon. This was to allow Tom maximum freedom to use as much of this sometimes rough, raw, but very real sounding live chorus as he chose, together with additional layers he might record later in post. A second machine was dedicated to recording the live vocal and piano mixes from Simon, and the third was used to turn around this recorded material almost instantly for playback. We might have been re-doing a section of a take and would want to play in the piano part that had been played live from a previous take, so keeping our established tempo – or even working with a combination of live piano and piano from a previous take being played back from Pro Tools, where the pianist and playback were involved in a complex dance of Pro Tools and live accompaniment.

"It was hard work for crew and kit: our laptops often overheating at the end of a fifteen hour filming day in the back of the van."

Hayes: "It was vital to have the live accompaniment from the music department but with the amount of radio frequencies already deployed on the set, I knew I wouldn't be able to use radio systems for the actor's earpieces, that just wasn't going to be possible.

"However I had used battery-powered induction loops in Greece for *Mamma Mia* so myself and my crew have extensive experience in the 'black art' of induction! We sourced the highest quality loop amps we could, and with a suitable range of power outputs to cover the set sizes we tried to deliver the best audio quality possible across a whole range of set ups and stages.We used up to 75 hidden earpieces at once on the big chorus numbers. This is in addition to a wireless feed of the mixed piano and vocals, a clean piano feed, and the usual camera feeds and boom talkback feeds. All this resulted in a significant amount of induction and wireless infrastructure that had to be rigged and ready to go at each location."

Les Heureux

McCann: "The sound and music departments really had to work as a team and were often working from two hours before the general call time to ensure that there was never a question of waiting around for sound. ...The whole team was signed up to Tom Hooper's vision, and that made the whole project doable.

Hayes: "The whole project was a true collaboration from the outset; the sound and music department had full support from Tom Hooper and producers Eric Fellner,Tim Bevan, and Debra Hayward. The finished product, which is 99% live sound recorded on the set, definitely delivers what we set out to achieve – which was to bring the audience as close to the pure emotions of the cast in the moment as possible. The live singing is a testament to what can be achieved when everyone on the set works together.

The Sound team, left to right: Simon Hayes, Paul Schwartz, Arthur Fenn, James Gibb, and Robin Johnson

It just would not have been possible without the help of each head of department from production designer to DOP, to costume designer to Special FX: every crew member adjusted their own workflow to help and encourage the capturing of live vocals. It was a fantastic piece of team work.

McCann: "I know that many people in the industry have been watching this 'impossible' project really closely, and I hope we've proven that not only is it possible, but actually preferable to do a musical this way, the benefits of live recording are there to be seen in the on screen performances. I think it might well change the way we do musicals from now on – *Les Misérables* is that significant a step."