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Toulson, R.

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The dreaded mix sign-off: handing over to mastering

Rob Toulson

1. Introduction

The final stage of mixing, and indeed the final responsibility of the mix engineer, is usually the handover to mastering, which brings a number of creative and technical considerations. In the traditional approach to music production, mastering is conducted by a specialist audio engineer once the final mixes have been consolidated to a stereo format. In the early days, mixes would be recorded to a physical 2-track analogue tape that would then be shipped to the mastering engineer. Nowadays it is more common for the stereo mixes to be sent as lossless audio files through an internet file transfer. The final signing-off of the mix is an intrepid point in the process, requiring the artist, music producer and mix engineer to agree that they have completed the mixes, which can reveal any uncertainties or insecurities that they may bear in relation to the project. The mix sign-off and handover to mastering is therefore seen as a critical and crucial point in the music production process.

Approaches to, and technologies for, mixing and mastering have evolved, as with all aspects of music production. New methods and approaches bring opportunities to simplify and reduce the cost of production, though with the potential for practitioners to inadvertently cut-corners and underperform in both creative and technical contexts. Modern processing tools enable mix engineers to also master their own music too, and there are a number of arguments for and against the use of mastering techniques at the mixing stage. For example, it can be argued that mix engineers need to take a greater responsibility towards technical attributes such as dynamics and noise cancellation. Whereas, in contrast, the use of mix-bus limiting when generating draft listening copies can confuse and falsify the sign-off process. Furthermore, it may be seen that mastering engineers prefer or are requested to work from mix stems (i.e. a

number of consolidated audio tracks that collectively make up the mix), but does that mean they are effectively mixing as well as mastering the songs?

This chapter discusses the critical point of completing the mix and moving towards mastering, that is, it considers the crucial process of 'signing off' a mix and reaching agreement between stakeholders that a song is ready for mastering. The discussion draws on the experience and expertise of a number of award winning mix and mastering engineers through direct discussion and interview, particularly with respect to methods and contemporary practices that are common at the mix-completion stage. The mix and mastering engineers contributing to this chapter are George Massenburg, Mandy Parnell, Ronald Prent, Darcy Proper and Michael Romanowski, whose professional insights give a first-hand reflection on best practice for finalising the mix and handing over to mastering.

2. Decision making and signing-off the mix

The final signing-off of the mix is a hugely difficult task, as it is the critical point in the music production process where the most significant creative and technical decisions are committed for the final time. Signing-off can expose any uncertainties or insecurities that the artist, producer or mix engineer may bear in relation to the project. Historically, mixes would be bounced down through an analogue mixing desk to a physical 2-track analogue mix-master tape. The tape would then be shipped to the mastering engineer, who would then manipulate the audio where necessary and cut the master disc that would be used to manufacture vinyl records. Therefore the sign-off process was final – it was far too time consuming and costly to make any changes after final mixes were committed to tape. In many ways, the modern process makes things more flexible. Total recall of 'in-the-box' mixes means that it is very easy to make small changes at any time, and the possibility to quickly share files over the internet means that, on the surface, there is little additional cost or time constraint with making such changes. However, it appears that the modern process, though much more flexible and reversible, often makes it harder for

artists and engineers to sign-off a mix, which can be considerably disruptive if the mastering has already started.

Mandy Parnell, of Black Saloon Studios in London, is a Grammy Award winning mastering engineer who has worked with the likes of Bjork, Annie Lennox and Aphex Twin, among many others. Mandy explains that artists and mix engineers now regularly find it hard to agree on the final mix:

> *"I've noticed over time is that when clients can hear their music on professional loudspeakers, they realise there are details they hadn't heard before, so one of the trends is that the number of remixes that are presented to mastering has increased over the years."*

Mandy explains that the time and cost implications of this "back and forth" can be substantial:

> *"People just want to tweak. It's a big problem. We have to take notes on everything; in mastering we are still using a lot of analogue tools, so to recall a whole album is a lot of work if the client has gone back in and tweaked the mix."*

Ronald Prent, a recording and mix engineer at Wisseloord Studios in The Netherlands, who has worked with many successful artists, including Elton John, Def Leopard and Rammstein, concurs with Parnell's assessment. Ronald explains:

> *"We live in a world of instant recall and I think that's a reason why people want to change things after they've signed-off. But if you strive for a little bit more quality, so you don't mix in the box, and instead you use an analogue console or you use outboard equipment, then it's not as simple as pressing a recall button, it takes two hours.*
>
> *I find, because I work that way, artists get the time to listen and sign it off, and until I finish the whole album they have plenty of time to reflect and request changes. But they know that two days after I've finished the project, and I'm on another album, if they want to change anything then that costs money. That really stops people from doing the stupid 'can you*

increase the guitar 1 or 2 dB?' I choose the analogue approach because it makes the client listen more carefully and listen more to the essence or the song. Is the song really going to be better if I put the guitar up by 2 dB, or does it really matter?"

George Massenburg, whose career has covered many aspects of music production and technology development, earning him Grammy Awards and production credits with artists Earth, Wind & Fire, Billy Joel and Lyle Lovett, agrees on the benefits of working with an analogue mix setup:

"Working on a desk means you are learning the song as it goes by. You mix live as the song goes by and you're making a commitment to the levels."

Ronald Prent emphasises further that mixing in an analogue environment helps with decision making and reflecting on the context of the whole song as opposed to just short passages at a time:

"When you work with an analogue tape machine, you press play and you listen to and mix the whole song, and then when it's done you rewind and press play again. Nowadays people loop a 10 second section for half an hour, then they loop the next 10 seconds for half an hour too. I insist that the students who I teach listen to the whole song. I tell them not to loop, to play if from the beginning, so when they make a change they know whether it works or not for the whole song. The rewind time is important too, because you think and reflect while the tape is turning back. I play from the beginning to the end and I mix the song. If you hear things 20 times in a loop you get bored and you lose judgement of its context with the whole song."

George Massenburg explains a wise approach for agreeing and signing-off aspects of the mix as it is in process:

"In the very earliest steps of the mix, especially a big complicated mix, the thing you have to get right is the vocal. To get that right you need the artist to sign-off on a vocal sound before you build the mix around it."

Darcy Proper is a multiple Grammy Award winning mastering engineer from Wisseloord Studios, who identifies that an artist's confidence in their work contributes significantly to the challenge of signing-off a mix:

> "Part of the reason why people are putting off decision making until the last possible second is because they are working in environments that make it difficult to make those final decisions with any confidence. One of the downsides to people working at home in an uncontrolled environment is that it's very difficult to have the same level of confidence as there was years ago when all the processes needed to be conducted in a professional studio. I think insecurity is part of the equation, its not just a lack of knowledge, but, because of the circumstances in which people are working - and in many cases within the budget which they are working – it's very difficult for artists and mix engineers to say 'ok, yeah now I'm sure that it is done'."

Darcy adds that sometimes being too close, or too emotionally attached, to the music can cloud the sign-off process, and means that moments of accidental beauty might be discarded if someone has an unattainable vision of perfection. It is usually therefore beneficial for artists and songwriters to work in teams with specialist mix and mastering engineers, rather than alone:

> "There could be a beautiful natural performance where there is a fantastic break in the artist's voice, just at the moment where it is reaching its emotional peak of poignancy, and as a first time listener you hear that and it just makes your heart break and you think, 'that's perfect because it's not perfect'. That fresh perspective when you hear it for the first time [as the mastering engineer] is the same perspective that listeners will have when they hear it for the first time. I think that's an important part in the decision making process. If you leave those decisions to the people who have been on that journey the whole time, their tendency might be to fix things that aren't broken and thereby take the beauty and the joy out of the nuances and the beautiful flaws."

Ronald Prent also emphasises that the reversible processes that have been allowed by digital audio workstations (DAWs) actually encourages practice that is counter-productive with regards to decision making:

> "I think in an education context we should ask Avid to make a Pro Tools version that doesn't have an undo button and only allows destructive recording. I'm serious, because that's how we learn to make decisions, but not only technical decisions, very much musical decisions too. If you add something new and it doesn't work, then it's because what you have recorded is good already and there's no space for hundreds of keyboards overdubs and percussion samples and programming, because you've already determined musically what is right. If you do destructive recording, once you hit record the other content is gone, so you have to make musical decisions based on technical knowledge – the undo button killed music as far as I'm concerned."

Critical decision-making is certainly one of the most important skills required for creating a good record, throughout the complete recording, mixing and mastering process. As Mandy Parnell simply states:

> "Mixers need to own their mix."

Michael Romanowski, a Grammy nominated engineer from Coast Mastering in San Francisco, with several thousand credits to his name, echoes this sentiment, noting the crucial importance of the artist taking responsibility for their music:

> "An important trait for artists to adopt is having courage, owning your own music, having intent -why are you making it sound like this?"

It is clear therefore that if artists and mix engineers are brave and focused, and have reasons for their artistic choices, then this positivity can drive the record production forward in a successful and productive manner. However, one further issue at the mix sign-off stage is with artists being unsure how their mix will translate into the real world of music consumption, with its unlimited number of playback systems and formats. Ronald Prent explains:

> "Signing-off the mix has changed in many ways. More and more often the

artist is not there when you are mixing, and they want an MP3 to listen to after the session, because that is how it will sound on iTunes or an iPhone. This is the quality they are used to judging, if they are in the studio listening through a pair of real speakers, it scares the shit out of them sometimes, because they hear the detail that we are used to hearing, but they don't know how to deal with it."

Ronald's solution is a novel one:

"I stream to my client when I mix live and then they can choose whichever mobile device, earbuds or computer speakers they want to listen on. I stream MP4 live the whole day and they can listen in whenever they want, if they are well equipped I can stream 96/24 lossless too. Artists are starting to demand that and it really works. The comments I get back are good comments, they can Internet chat with me in shorthand and I get far better comments, they are coherent and easy to translate."

3. Comparison is the route of all discontent

In signing-off a mix, artists and mix engineers are often drawn to compare their work with that of other practitioners. This can be a dangerous element to throw into the critical and delicate process of mix sign-off. George Massenburg recalls:

"There is an old aphorism that says 'comparison is the route of all discontent'."

Michael Romanowski equally dispels the theory that comparison is necessary for sign-off, and states that comparison and competition has no valid place in music production:

"I don't understand or agree with the idea of competition in music production. This is art and it shouldn't be 'this painting is more blue than that one, therefore this one wins' we don't do that. Own your mixes rather than compare them to somebody else."

Darcy Proper also agrees that making music in comparison to some other art is essentially a contradictory process:

"It's a funny message that we get from our clients; their music is completely unique and impossible to characterise and they are very proud of that fact, but they also want it to sound exactly like whatever is on the radio right now! Artists should celebrate their music for the fact that it is unique and let every part of the production process celebrate that uniqueness, rather than trying to turn it into a song that sounds like something that is already there in the top 40."

There is clearly a fine line between using reference material as a source or inspiration, which is deemed positive, and as a source for comparison or competition, which is regularly counter-productive. While professionals agree that good music is something that should be celebrated for it's uniqueness, using examples of high-quality recordings for inspiration can clearly help the focus and direction of the mix and mastering processes, as George Massenburg states:

"It's good advice for the mix engineer to get reference material from the artist at the very beginning of the process. Play me a CD or whatever, give me some idea where you want to go with this and we can at least tell you if it's not possible! If necessary you can tell the artist 'you can't get there from here', because that's not what you have on the recording. But identifying the artist's irrationalities early on is helpful!"

Equally, Mandy Parnell describes the importance of reference material and creative insights at the mastering stage, in enabling her to giving the mix it's necessary final polish:

"If artists can give us direction that helps. Some of my clients describe things in pictures and abstract art, they come in with laptops, show me pictures, play me music, we talk a lot. I think there has to be sufficient communication, you can't just send the mix without the context or a reference point."

Ronald Prent also highlights misconceptions on the level of manipulation and improvement that can be achieved at the mix stage:

"If you just mix a project, it's two or three songs of total guesswork and

sometimes you find out after mixing three songs you've just been enhancing what they've recorded and carried on with that vision. But it's totally not what they want, they want a completely different record, like they've recorded acoustic guitars and nice piano but they want an AC/DC sound. And sometimes I have to sit there and say, sorry you didn't record that."

In particular, Ronald explains his go-to records for defining a high-quality final mix:

"One of the best reference points for me, is Songs In The Key Of Life by Stevie Wonder, the song Isn't She Lovely, it's very low volume. It's better than many modern references; they often sound crappy and distorted.

Another great reference record is Joshua Judges Ruth by Lyle Lovett, which was mixed by George Massenburg. That record changed my life. It has the right footprint sonically, dynamically, because it's made with passion for music and audio and you can put it on in any studio in any place and if you know how that record is supposed to sound, there you have the best reference for mixing. I grew up with these records and if you get anywhere close then you're doing a great thing."

Mandy Parnell, highlights the challenge of finding valuable reference material for mix engineers, agreeing with Ronald Prent that older records are more realistic comparisons, given the high levels of loudness that are prevalent on modern recordings:

"I find especially with young mix engineers and producers, they don't have a suitable reference point. The modern references they have are already mastered, a lot of them to a ridiculously loud level, so they are chasing those productions and mixing to compete with something that isn't technically correct. I'm trying to educate people to listen back to classic recordings. But even some of the classic albums have been remastered recently, and they are not a great reference point sonically, in comparison to the records I grew up with."

4. To stem or to not stem?

A modern approach to mastering uses a number of instrument stems, allowing the mastering engineer to manipulate individual aspects of the mix, rather than just the entire mix. The stems are created by the engineer, on completion of the mixing, by soloing groups of instruments that have contributed to the final mix. Each stem will usually be a stereo file and there may be, for example, an individual stem for each of drums, bass, keyboards, guitar and vocals, depending on the type of music. Usually effects, reverbs, delays and parallel processing will be present in each stem too.

At first, mixing to stems appears to be advantageous for allowing the mastering engineer more options and flexibility. Many mastering engineers, however, report that if a producer desires the mastering to be conducted from stems, then it indicates a failing earlier in the mix or recording process, or an unwillingness to decide on a final balance for the mix. Mandy Parnell explains:

> *"People are asking me to master from stems, but basically they are just failing to make decisions or sign off."*

Furthermore, the use of stems at the mastering stage, means that the evaluation of balance - the relative volumes of instruments - becomes the ultimate responsibility of the mastering engineer, which Mandy points out requires different listening skills:

> *"Working with stems requires a different headspace. Mastering engineers listen differently to mixers. Stems take us out of our comfort zone and put us in a mix zone, which isn't our expertise and usually the results are not as good. Mastering engineers tend to work on emotion, whereas mixing is all about balance".*

Darcy Proper also emphasises that a different mind-set is required for evaluating balance versus the sonic attributes of the song as a whole once complete:

> *"The reason I'm not a mix engineer is because mixing is a different mind-set. When you are rebalancing things, it's a very different focus than the fine-tuning of EQ and compression that's involved in mastering."*

Michael Romanowski feels even more strongly, altogether refusing to master music from mix stems:

> *"I don't do stems, that's not my job as a mastering engineer, that's mixing. I feel strongly that if you can't make the decision then you are not ready for mastering. It's lazy, if you're hired as a mixing engineer to do the mixes, then mix it, don't bring it to me to do your job!*
>
> *With mastering, there are just two channels. You are asking 'how does the content present itself when it's finished; dynamically; EQ-wise; fades; spaces; order?' Mixing is balance. If I'm asked to take stems that means I'm not being completely objective with the presentation of the music. If I can sit back and listen to the presentation then I can develop an opinion on how it sounds and I can make an appropriate judgement and decide the actions to take from there."*

When the mix engineer creates mix stems, an important aspect is to ensure that the individual stems, when summed together, are identical to the stereo output that was used to monitor and sign off the mix. Unfortunately this is very often not the case, as Ronald Prent explains:

> *"If you give the stems for mastering - no matter how well you set up your routing on your console and how well you manage your gain structure - if you add the stems up, it's not the same mix, because it doesn't use the processing that you use at the end to make your mix."*

Darcy Proper agrees; although she is willing to work with stems if necessary, the best results come when a mix has been properly signed-off:

> *"The projects that have turned out the best in my career, they have all come from stereo mixes, not stems. Of course stems have an important place in film and game music, but, most of the time, the sum of the stems doesn't equal 'the mix' – it's never quite as simple as summing up the stems and then playing those all off at zero."*

The argument that stems allows different aspects of the mix to be mastered separately is not one that simplifies the process, indeed it makes mastering

much more complicated, as Darcy explains:

> "If they haven't submitted a complete mix, then what's often needed is far more complicated than just adjusting the individual stems by a certain level for the whole piece. I may likely need to look across the whole song, raising vocals during the chorus and dropping them maybe in the verse. It really is mixing and it's very different to what we should be doing at the mastering stage."

George Massenburg emphasises this point even further:

> "Does anybody like stems? I hate having to send stems for mastering, It's not as simple as people think. For example, if the A&R department gets back to you and says 'well, you got to bring up the bass', it's a lot more than that; you have to add the bass and a little more kick and whatever else is in the low end, the low end of the piano, the low end of the voice, everything changes. These things do not exist independently and the fiction of stems is that you can allow the record company to make what is in their mind an improvement, and they are just idiots, it's not an improvement."

Massenburg goes on to emphasise that the use of stems is indeed a method of avoiding key decision making, and allows record companies and A&R representatives to take more of an active role in the music production process:

> "Working with stems is basically a means for A&R to get their hands on your record and to control something about the record and, most importantly for them, to own a part of it. It allows insecure A&R men to take ownership of something."

Ronald Prent also highlights somewhat underhand processes that can take place following the delivery of stems to the record label:

> "We are asked to print stems just in case. It's usually the client, artist, producer or in some cases record companies that demand stems for remixing purposes. But they don't want to pay any more, or they want to give your stems to someone else to remix, which I find very underhand."

5. Mixing and mastering in a single process

The widespread availability of consumer digital audio workstations and advanced audio processing plug-ins means that it is now possible for anyone to record, mix and master their own music at relatively little cost. Given the challenges with raising budgets for music production projects, it is therefore possible to cut costs by working autonomously. In particular, it is now possible for an engineer to attempt to mix and master their own music, sometimes in a single process. Michael Romanowski suggests that mixing and mastering should rarely be conducted at the same time, or by the same person, because the objectives for each process is very different:

> "There are cases where with the right person who knows what they are doing, with the right perspective and intent can take both roles. But it is decidedly two hats, because your objectives for mixing and mastering are completely different. It's not simple to do - putting something on the output bus of a mix and saying that is mastering - that's not mastering, that's something completely different, that's finishing the mix."

Michael also emphasizes the importance of critical and objective listening at the mastering stage, and highlights the challenges with moving between creative and technical processes in music production in general:

> "This is art and art is expression. We have a left-brain and a right-brain, and I think of it like a pendulum. The brain has a creative side and a technical side and if you're the artist and your going to try to record and mix yourself, you think 'I've got a great idea for a song, now I'm gonna open up a preset on a plug-in and connect this thing in here, wait a minute, what was that lick again?' I feel like the pendulum never swings nearly as far as it should on either side because it's constantly going back and forth and you're not getting your full artistic expression, nor your best technical level of capturing that. So consider hiring professions throughout the chain to be able to do the best they can to represent that art."

Darcy Proper also emphasizes the difficulties with taking the responsibility for both mixing and mastering a record:

> "As the artist or mix engineer, by the time you get to the mastering process you are in one of two states: Either you feel that it's absolutely your best work and you may be tempted to believe that it's perfect and doesn't need further mastering, while a few minor adjustments could really make it shine. Very often the opposite is true too, in that it doesn't excite you anymore, because you're just tired of it. Then you start fixing things that aren't broken, and when you start fixing things that aren't broken you are actually doing harm and damage. That's one of the advantages of having another person involved who doesn't bring any baggage to the session."

There can be a temptation to consider mastering as simply raising the loudness of mixes to a commercial standard, and, as such, it is possible to add loudness by using a limiter plug-in on the mix output channel. However, most professional mastering and mix engineers agree that this is not good practice for a number of reasons. Michael Romanowski explains:

> "I've seen people say 'I'm gonna start a song and I'm gonna put a couple of EQs and a compressor on the master bus and I'm gonna mix the song'. That to me is like saying 'I'm gonna start with a cup of salt and I'm gonna now make me some soup!' Do either of those things make any sense to anybody?

> When someone says to me they are going to master a track by adding some EQ to the master bus I always go back to the question 'why?' And if they say it's because the guitars are not bright enough – well fix the guitars, work on that. That's not mastering, that's just fixing a mix and for us to blur those lines between mixing and mastering is dangerous for the art form. As a mastering engineer I might not put any EQ on it, I might run it through a valve processor and realise it doesn't need any EQ at all."

George Massenburg and Mandy Parnell emphasise that there are certain cases

where the mix engineer might master their own music. George states

> *"There are occasions where there's barely a budget for mixing let alone mastering, so I'll do some EQ and a little bit of dynamics on the bus. But if I run into a wall I go back and change the bass level or I change the kick if it's punching holes, I'll pull it back a tad. I think there is a case to be made for doing that with sensitivity and objectivity sometimes."*

Parnell also states that:

> *"It works maybe for some kinds of electronic music and some metal which is very aggressive. I think there is a place for it, but most of the time I'd say it should be avoided."*

Darcy Proper has practical advice for producers working on a tight budget, where the mixing and mastering must be conducted by the same engineer:

> *"My advice is don't mix and master in one step. Finish your mix, print your mix, then take that mix and master it as a separate process, not within the same DAW session. If you do have to master it yourself, take a break, take some time between the mixing and the mastering. It should be two separate steps."*

One unique and regularly prevalent issue is that review mixes are rarely at the loudness of commercial music, so clients and artists struggle to evaluate the mix, given that it will be much quieter than mastered songs that are heard on the radio or in the charts. In this case it is often necessary to supply 'listener copies' of the mix that have been raised in loudness with some form of compression or limiting. Listener copies made in this way cause much confusion for artists and engineers, so it is important to have a clear and justified method for creating the listener copies. In addition to Darcy's previous advice about mixing and mastering as separate steps, she adds:

> *"If I could say one thing to every student or young mixer out there, it would be 'don't mix through any loudness software'. It is understandable that in order to get client approval – as many lack the imagination to understand how a mix might sound when it is mastered – you can give*

them a loudness enhanced version, but don't mix through the software that makes it loud. Make a good solid mix and then right at the end put the loudness tool across it and keep it as close to the intention of your mix as possible. That way you can give the mastering engineer both the reference version that you have sent to the client and you can also provide a finished mix that doesn't have that extra loudness maximisation on it."

Mandy Parnell also discusses the issue of mixing with limiters on the mix bus:

"There is a problem with this listening copy model, that mix engineers are being pushed to use limiters because artists and record labels want to hear loud mixes for review. The problem with mixing into limiters is that the final mix sent for mastering then has no relation to the listening copy, which is distorted and noisy. But that's what everyone has signed-off from, and that is our starting point. Many times I have to go back and ask them to put a bit of the listener limiting back on in order to get the sound they are after, but still it's too loud, and I'm starting from such a wrong place to master the record. I'd like to see us getting away from that, but it's about education and people have been working like this for maybe ten years now."

Darcy Proper also adds that any mix bus processing can actually mask issues that will still need to be resolved at the mastering stage, whereas they could have been treated better during mixing:

"If you mix through a loudness maximiser, or any kind of multiband compression, it does things through individual frequency bins, so you could potentially have too much 4 kHz content in your mix which the maximiser is keeping under control. But even though the copy the client approves sounds good, the mix still has an issue that needs to be rectified. Build the mix first, make that a good solid thing and then add the loudness afterwards."

6. Mastering engineer as mix consultant

The mastering engineer acts as a quality control expert for the final stage of a project, but can also act as an invaluable mix consultant, too. George Massenburg explains that he would regularly seek a mastering engineer's opinion throughout the mixing process:

> *"Doug Sax had a unique knack for, through mastering, moving the irrational to the practical. For many years he was our great advisor who we would talk to in the middle of the project, take him rough mixes and he would have no problem telling us if it sucked, or to do nothing."*

Mandy Parnell explains that it is in her interests to have as good a mix as possible. It therefore saves her time by helping out at the mix stage, or by requesting further modifications before mastering begins:

> *"Mastering engineers really need to advise producers and mixers more nowadays. I want to get a really great mix in, so it's in my interest to get a good mix first than to try to work miracles.*
>
> *Something I've started doing in the last five years, if they have the capability of going back and mixing in the box, I will send them back to remix rather than try to polish it in mastering. I give them a lot of direction and listen to lots of references with them and explain what they need to try and do with the mix, where it's going wrong."*

Darcy Proper emphasises that the mastering engineer's first listen is a valuable part of the music production process, the importance of which shouldn't be underestimated:

> *"We can be objective and have perspective and bring a fresh set of ears. When I hear a song for the first time I'm hearing it as a listener would be hearing it for the first time and I know I've got it right when I go from not knowing the song and not caring about it or having any feeling for it, to having dialled into the emotional content to the point where I have the goosebumps and I'm emotionally connected to it."*

Mandy Parnell agrees:

> *"My first perspective when a client comes in is the most important thing that they are paying for. My first listen, my first response, my first notes. The feedback they get from that point is the most important I can give, especially if the mix is wrong."*

Mandy also emphasises the importance of building up a relationship with the mastering engineer and continuing to collaborate on a number of projects to consolidate ideas and working practices:

> *"I say always attend the mastering session and build a relationship. I tell young producers to pick a mastering engineer and stick with them for a couple of years or projects. Use them as a sounding board so you can develop your mixing and build up an understanding."*

7. Conclusions

Clearly the boundary between mixing and mastering has become gradually porous in recent years, with digital technologies and the availability of home production systems creating an interesting circumstance which allows anyone to effectively take the role of mixing or mastering engineer, or both, at any given time in the production process. These advancements have in some way enabled us to cut-corners with the production process and reduce the number of expert ears that might be involved in the recording, mixing and mastering. The opportunity to put-off decision making to a later stage in the production is enabled by technology and the possibility to master from stems, for example. However, this trend actually appears to lead to greater indecision and insecurity in artists and engineers. Mastering engineers are wise and experienced listeners who can assist with mixing as well as mastering, and it is therefore beneficial to utilise them in any professional project. Ultimately, all studio engineers are here to assist the artists and to enable them to most accurately achieve their creative vision for a record, and any professional recording, mix or mastering engineer will be passionate about helping the artist realise that goal, as George Massenburg humbly concludes:

> *"At the end of the day, it's their record. Their picture is on the front and*

we are here to serve the artist and at the pleasure of the artist - and if we don't get it right we have every right to be fired. I've tried to do everything an artist ever asked me to do and sometimes I learnt something and sometimes they learnt something. We are here to chase down their vision."