Typology of Sound Signal Editing in Recording Practice

Martin Vrzal

Sound Studio HAMU, Malostranské nám. 13, 118 01 Prague
vrzal@hamu.cz

Abstract
Sound signal editing and methods of this treatment. Objective and subjective angle on considering continuity of signals at editing position. Criterion of amplitude, frequency, phase, spectrum, listening criterion and their preferences according to advantage of resulting signal. Analysis of typical situations.

Introduction

Sound signal editing pertains to a succession of techniques of sound signal processing and it is one from a series of basic techniques relating to sound recording. Its application is self-evident, but it is possible to come to grips with a series of problems. Sound signal editing means encroachment upon the natural course of sound signals, its taking out of primary context and its putting in another one created artificially. Choice of bad cutting position or its inconsistent treatment bring itself consequences that are possible to hear. Treatment of editing implementation that erodes continuity of primary recording is for this reason basic to successful processing of recordings.

Methods of treatment of sound signal editing

Sound signal editing we can in compliance with its application split up into several groups.

1) Treatment of start and end of sound signal (for example a block of music as a track on CD, sound sample, sound effect...)

2) Attaching a sound signal to another like one. (editing of music from different takes, reconstruction of damaged old records...)

3) Combination of sound signals that are mutually incoherent (creation of single sound tracks for movies, sound montage...)
4) Abbreviating and extending selfsame sound signals (treatment of sound samples, loops...)

For the treatment of single transiences between combined sound signals at position of cut we can use a method of crossfades. *Crossfade* means fluent crossing of the first signal (or its fragment) to another one. During this at appointed time, the gain of the sound signal changes its value.

It is possible to set up likewise shapes of changes (exponential, linear) and modes of arrangement around the position of cut (symmetrical or asymmetric). By analog recording crossfade was made physically by the bevelled cut of band. Intervention was destructive. Time of crossfade given by steepness of cut together with the speed of tape and position of cut were the sole variable of crossfade. In comparison with it digital recording offers more variables, because crossfade is made non-destructive through computation. Zero time means *sharp cut* by another name *vertical cut*, consequently cut without crossfade that brings immediate combining signals. Its calculated application is rather exceptional, because potential defects of linking a signal to another one is not treated at all.

Special types of crossfades are fade-in, when the first signal is silence (blank tape, starting gain of signal from digital zero) as its contrary fade-out with cross of sound signal into silence.

Evaluating a cut implementation

Quality, an implementation of cut we can evaluate from objective as well as subjective angles. We will make an inquiry into objective views of sound signals editing of

mono records and their influence on subjective evaluation.

For analysis of possible reasons for incoherence of sound signals combining ,we need an objective view on treatment of cut split up singlely, it falls in groups according to follow criterions.

1) *Amplitude criterion*
2) *Phase criterion*
3) *Frequence criterion*
4) *Spectrum criterion*

Amplitude criterion

Consequence of amplitude continuity dislocation of sound signal at edit position results from own substance of this criterion. Sound signal at edit position either will amplify or turn down. Resolving this is very simple especially for HD recording and it is a change of gain. On the occasion that incoherence of two signals that their amplitude changes course there is offered likewise another resolution. By utilising fitted crossfade it develops such as an enveloped signal that it could develop by a natural way. Let us look at abbreviating a flute tone for correction of rythm. (Fig.1)
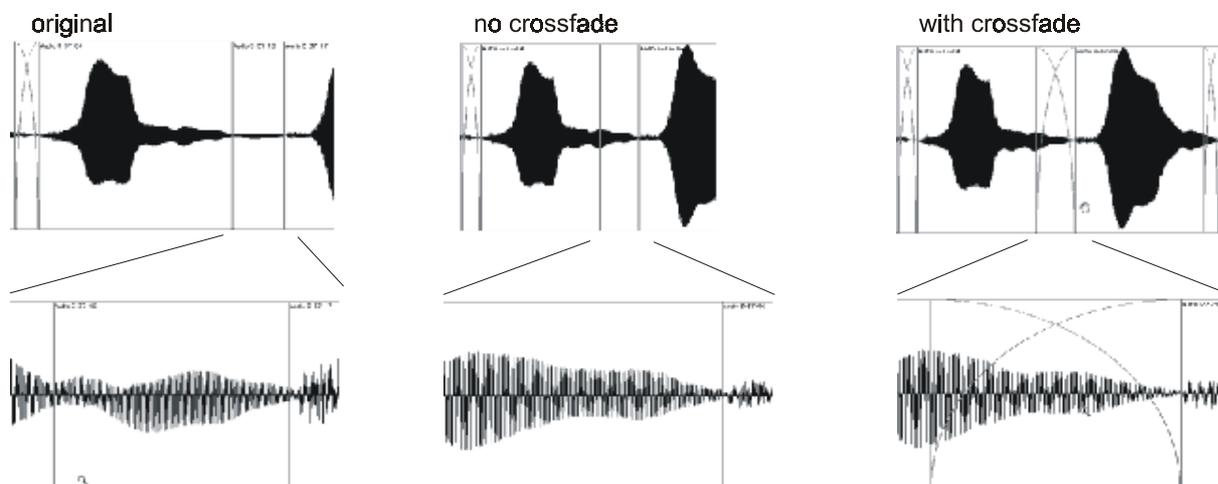
Fig. 1 Abbreviating a flute tone.

Phase criterion

This criterion puts emphasis on cut precision especially by application of long crossfades. By the sum of signals that are not in phase it occurs during resulting signals to pass amplitude decrease. It is often necessary to elect crossfade only so long that it does not give negative perception. The best example is editing of piano tones for correction of bad harmony unison. (Fig.2)

Frequence criterion

In recording practice of music we may take account of tuning fluctuation during playing in various takes. This problem falls into frequency criterion. Consequences of wrong cut implementation in this case becomes evident in this fall as duplicity of tones. Resolving this consists in application of a short crossfade and its routing into tone transient or outside different tone. This criterion we can show in an example of violin tones. (Fig.3)
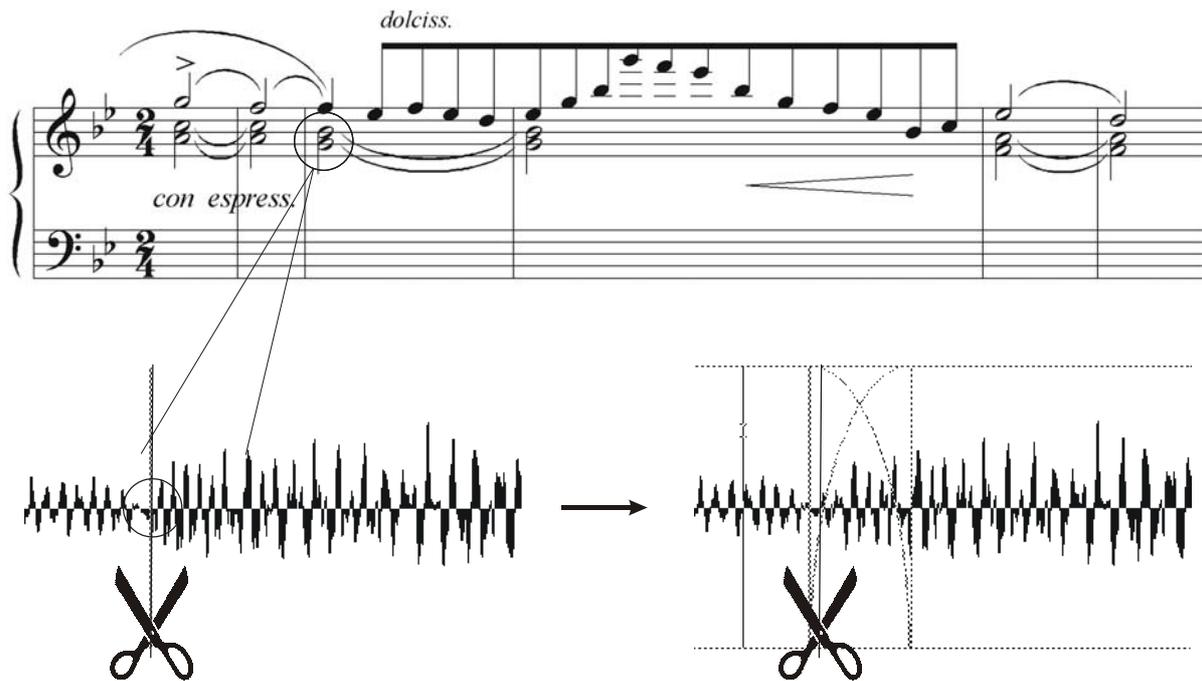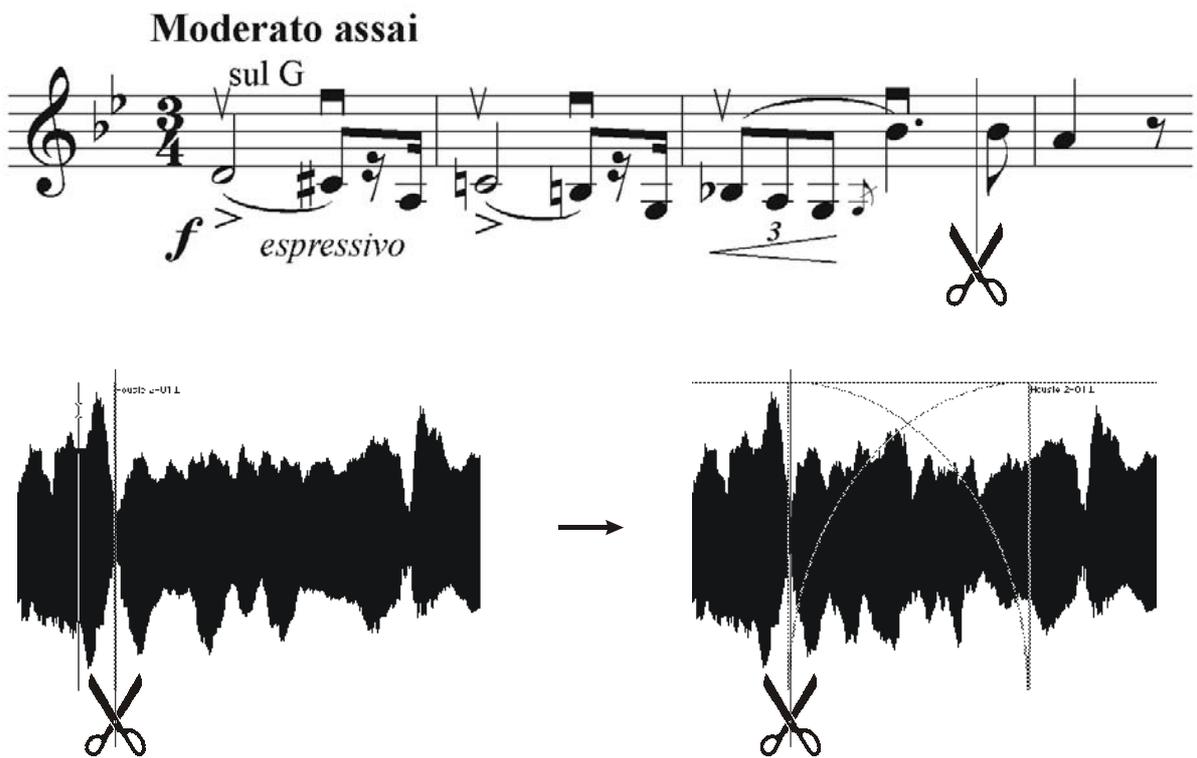
142

Fig. 2 Editing of piano tones.

Fig. 3 Editing of violin tones.

Spectrum criterion

This criterion we can find as a combination of previous criterions applied on single harmonics but we can extend it on perception of change of tone colour in cross point. It can make a different interpretation or accidental moves of player in several takes. In this fall , resolving often consists only in choice of another edit position. For example it demonstrates editing of guitar tones. (Fig.4)

Discussion

The above mentioned examples are from recording practices of classical music and that's why they were analysed by only several cases of combining such like signals sprung from the same source. Editing in this practice is itself very marked, because its goal is illusion of continuously played music. The resulting view of editing practice in classical music is that the objective angle predominates at the moment of cut implementation and its treatment by evaluating the accomplished quality subject is paramount.

Fig. 4 Example of editing of guitar.

Acknowledgements