Moving shots on a 3-D seismic survey

In a paper “Moving shots on a 3-D seismic survey: The good, the bad and the ugly (or How to shoot seismic without shooting yourself in the foot) published in The Leading Edge, May 2000, Donze and Crews describe what I call the conventional way of moving shots when obstacles preclude locating them on their pre-planned position. The method is based on trying to maintain fold as close as possible to what was planned. However, this technique treats shots as if they were individual entities without any relation to other shots. In the following I will briefly describe a better alternative.

A first and foremost requisite of seismic data acquisition is to minimise spatial discontinuities. Spatial discontinuities cause artefacts in all processes with a spatial component, in particular migration. Therefore, one must make sure to acquire common receiver gathers which look just as nice as common shot gathers, and neither of the two should show any discontinuities. Usually, continuity of the shot gathers is properly looked after, but it is equally important to acquire receiver gathers without any spatial discontinuities. The only way to achieve this in the presence of obstacles, is to aim for smooth acquisition lines, along which shots or receivers are regularly distributed. This is further illustrated in Figures 10 and 11 of my paper ”3-D symmetric sampling in theory and practice”, TLE, November 1999”. Moving a shot without looking at its neighbours creates discontinuous receiver gathers, hence artefacts in the migration result.