Section 4.1 – Shooting Miniatures

04.06.09 – Draft 01 – Matt Stalker

The production of "Sugarplums" requires photography of an electric train which, at a scale of 1:48, could be considered a "miniature". Use of models in filmmaking is as old as the art itself, with very sophisticated examples appearing in well-known early films like Harry O. Hoyt's The Lost World (1925), or Fritz Lang's Metropolis (1927). Shooting miniatures presents specific problems regarding depth of field, shutter speed, and scale which require special attention by the visual effects cinematographer.

Miniatures are often filmed with the intention of creating a composite final image. When manipulating depth of field, the integration of multiple plates should be considered. If the depth focus between plates is too different, it becomes obvious they were not filmed by the same camera at the same time; the goal of any good composite. In the American Cinematographer Manual, Dennis Muren states, "The entire model and set must appear to be in focus, as it probably would have been if the scene had been built full size..." (261). Taking that concept into consideration, when filming miniatures for compositing, all foreground elements must appear in relative depth of field to their associated background elements. "Deeper" focus is generally achieved with smaller apertures. Proper exposure with such settings will in turn require more light and slower shutter speeds.

Small objects, when in motion, and framed fully for large scale, may exhibit an undesired amount of motion blur. In my camera tests with a Panasonic AJ-HDC27FP Varicam, I experienced this problem. An electric train, 1/48 scale, at a distance of about 2 feet, a focal length of about 50mm, and a frame rate of 24fps, appeared too blurred with motion running at the slowest possible speed. The solution to this problem is a faster shutter. The smaller the slices of time the shutter remains open, the smaller the increment of movement by the train. The result is less motion blur. The issue, however, becomes exposure. The combination of a smaller aperture as described above and a faster shutter will demand a vast amount of light to properly expose the image. In my test environment, the best settings I could achieve were f4 at 60fps with a shutter of 120 degrees.

Creating a believable relative scale between two plates in a composite image is another piece of the puzzle. Miniatures are commonly filmed with wide-angle lenses from a low horizon line (Muren 261). It will be important, however, to again consider plate integration, and to match focal lengths and points-of-view from shot to shot.

In preparing “Sugarplums”, close attention should be paid to depth of field, shutter speed, and scale. It will be important to collect survey data of focal lengths, apertures, shutter speeds, and camera to subject distances. With this data, it should be easier to create multiple plates for seamless compositing.

References

The Lost World. Dir. Hoyt, Harry O. First National Pictures, 1925.

Metropolis. Dir. Lang, Fritz. Paramount Pictures, 1927.

Muren, Dennis. "Photographing Miniatures". American Cinematographer Manual. Ed. Stephen H. Burum. Ninth ed. Vol. 1. Hollywood, CA: American Society of Cinematographers, 2007. 261-63.