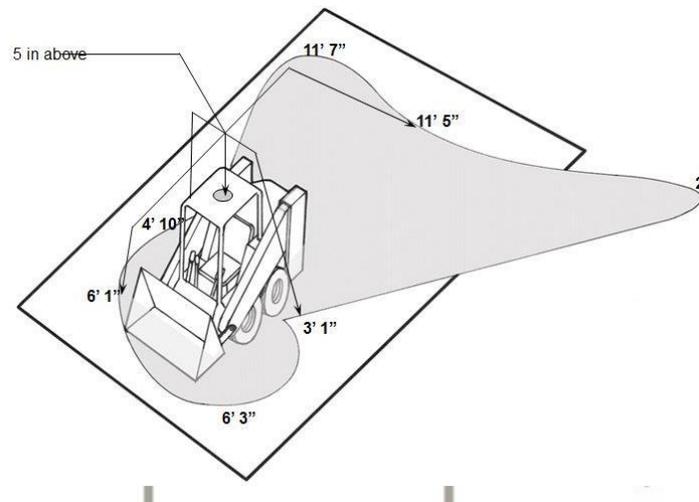


THE SKID-STEER MACHINE

Because of its versatility the Skid-Steer Machine is found on many construction sites and farms.



Skid-Steer machines are designed to make quick movements in all directions, going backwards and forwards and turning every few seconds. Due to their design, skid-steer machine loaders have compromised vision to the side and to the rear with large blind spots at the rear. The blind spots can be illustrated by the following diagram:



The operator is faced with the task of trying to turn and look into these various blind areas while at the same time operating the machine. This task has been made more difficult because starting in 1980 manufacturers started introducing various operator safety features such as ROPS (Roll over Protection Structures), FOPS (Falling Object Protection Structures), Interlocked control systems (restraining bars) and seat belts.

A view of the operator's position in the vehicle illustrates the result of all these safety requirements:



The main torso of the operator is held firmly in place by restraints so any viewing of the side or rear can only be obtained by turning the head.

All of these safety features has made the task of turning to look into blind areas almost impossible for the operator. Not being able to see these areas results in accidents. As stated in SAFETY SENSE, Newsletter April 2010, by Professional Landcare Network;

“ One of the most common mistakes skid steer operators make is being unaware of their surroundings. This is particularly dangerous with these machines since sight lines to the left, right and rear are limited. Accidents commonly happen when an operator establishes a routine and does a quick turn as part of it, hitting someone standing to the side, or backs over someone or something.”

THE PROBLEM: To provide the operator with the maximum view possible, acknowledging that any attempt to provide such view is hampered by the safety features presented above.

One factor that aids us in this endeavor is that during the development of the above safety features, most manufacturers have reduced the size of the rear pillars on the machines thereby increasing the size of the rear window. The obvious vision solution would seem to be the installation of a rear view mirror on the machine.

Only one manufacturer JCB offers a rear view mirror as standard equipment on its machines, illustrated in the following photo;



Sitting in the driver's seat illustrates that this solution provides minimum help to the operator primarily because the mirror technology being used is a wide angle standard convex mirror, which produces images smaller than normal so the operator cannot make them out clearly. Also note that the size of the mirror itself is too small to offer the operator the best view possible.

At M-C North America Inc. we have spent the past 7 years perfecting a new mirror technology that expands the field of view while maintaining clarity of view. Our glass is a multi-camber glass that is so unique, i.e. different from the standard convex mirror, that we have been granted a US Patent (No.8,172,411). We have taken this glass and included it in a 4 x 10 inch (101.6 by 254mm). To illustrate the difference the following photo shows the M-C Mirror held over the manufacturers mirror in the above photo:



Note the size of the vehicle behind the skid-steer in both photos, with the standard convex mirror the unit immediately behind the subject vehicle appears to show the unit much farther away from the subject vehicle than it really is.

Manufacturers use varying methods to provide the Falling Objects Protective Structure (FOPS) on the top of the machine. Use of the M-C Mirror technology still provides the operator with visibility to the rear. An example of one of the most severe protective structures shown in the photo below, with the M-C Mirror located on the bar in front of the operator's cage illustrates the view.



On a less severe Falling Object Protective Structure (FOPS) and no side curtains the full benefit to be achieved with the use of the M-C Mirror is illustrated by the below photo;



Our 4 x 10 (101.6 x 254mm) mirror is constructed of carbon steel, 4 mm glass and is

available heated or non-heated, and is easily mounted on the cross bar at the front of the operator's cage, and even with a machine equipped with all the mandated safety features could aid in preventing backing into vehicles and/or persons behind the machine.

Richard T. Ince
VP, Safety
M-C North America Inc.