

Test Report: Comparison of Koehler Wheat XL to Wisdom Wiselite beam shape and illumination of hazards at ground level.

Purpose: In 2022, there were a recorded 872 lost time incidents at US mines due to slips and falls. A caplamp with proper optical design will cast light on these hazards and help prevent, or reduce frequency of these lost time incidents. Test is designed to evaluate caplamp performance in illuminating slip, trip and fall hazards on ground in proximity of the wearer.

Test: Light intensity at ground level measurement at varying distances from light source.

Methodology: Lamp mounted on a fixed point 70 inches above ground (approximate lamp location of average height wearer), and lamp angled perpendicular to the wearer as if user is looking straight forward. Lux measurements were taken to measure light intensity on the ground at various distances from the wearer

Results:

Distance (feet)	Koehler Wheat XL	Wisdom Wiselite
	Lux	Lux
0.5	2	0
1	3	0
2	3	0
3	4	9
4	4	9
5	4	7
6	4	4
7	5	1
8	7	1
9	11	1
10	17	3

Table 1 – Lux Measurements at noted distances.

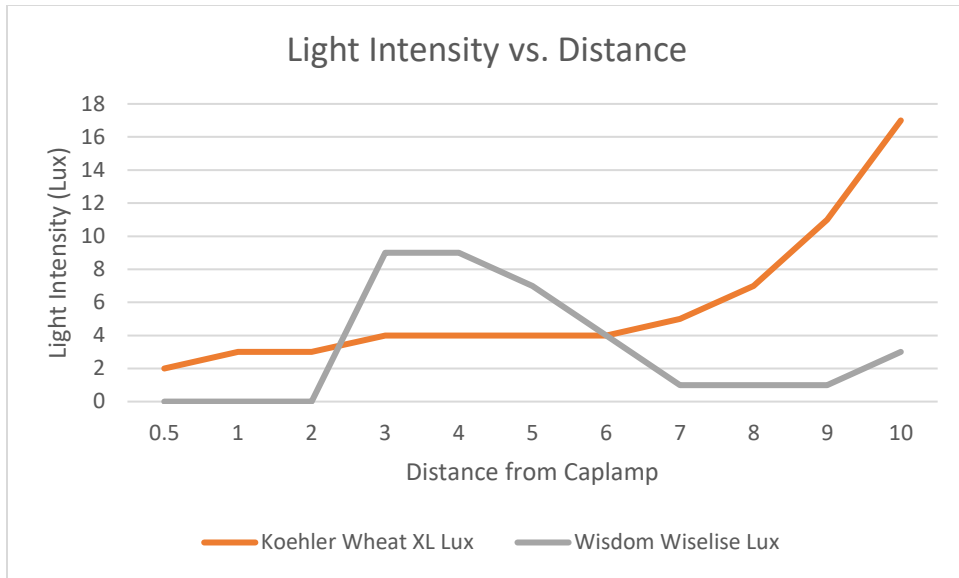


Chart 1 – Light Intensity vs Distance from Caplamp

Summary of Results:

Koehler Wheat XL has uniform light pattern of increasing intensity beginning at 6 inches from the caplamp. Illuminates ground level in consistent pattern with increasing intensity.

Wisdom Wiselite 2 shows non-uniform light pattern. First measureable light occurs at 3 feet from wearer. Intermediate ring of light from 3 feet to 6 feet before a dark low light section from 7 to 10 feet before again increasing at 10 feet and beyond.

Conclusion:

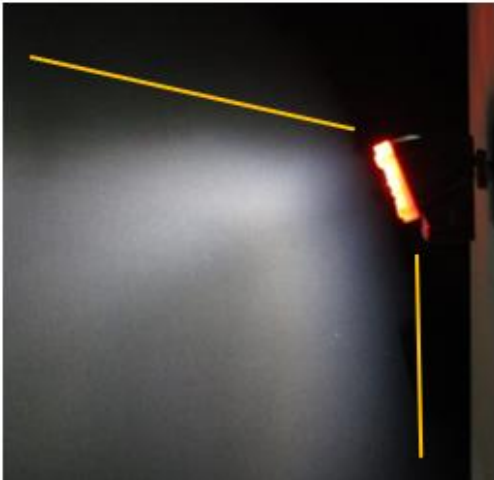
Koehler Wheat XL caplamp will illuminate slip, trip and fall hazards from as close as 6 inches to the wearer. Wisdom Wiselite 2 caplamp will not illuminate trip hazards until 3 feet from wearer, and will have diminished ability to illuminate hazards between 7 and 10 feet from the wearer.

Photo Summary:

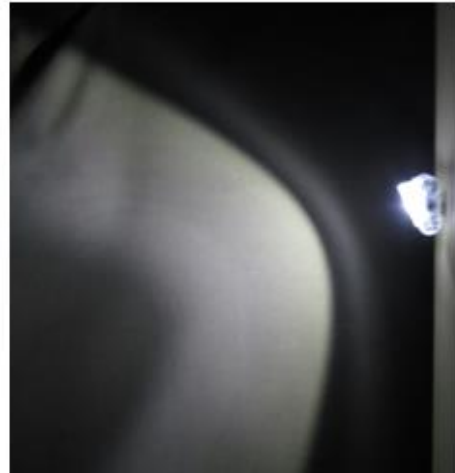
General Light Pattern Comparison

Summary: Wheat XL beam angle designed to illuminate ground level directly in front of wearer, by using light that would otherwise illuminate outside of wearers field of vision obstructed by hardhat brim. Wisdom Wiselite has typical conic pattern of light, leading to wasted light outside of wearers field of vision and minimal light at ground level in near proximity to wearer.

Wheat XL



Wisdom Wiselite



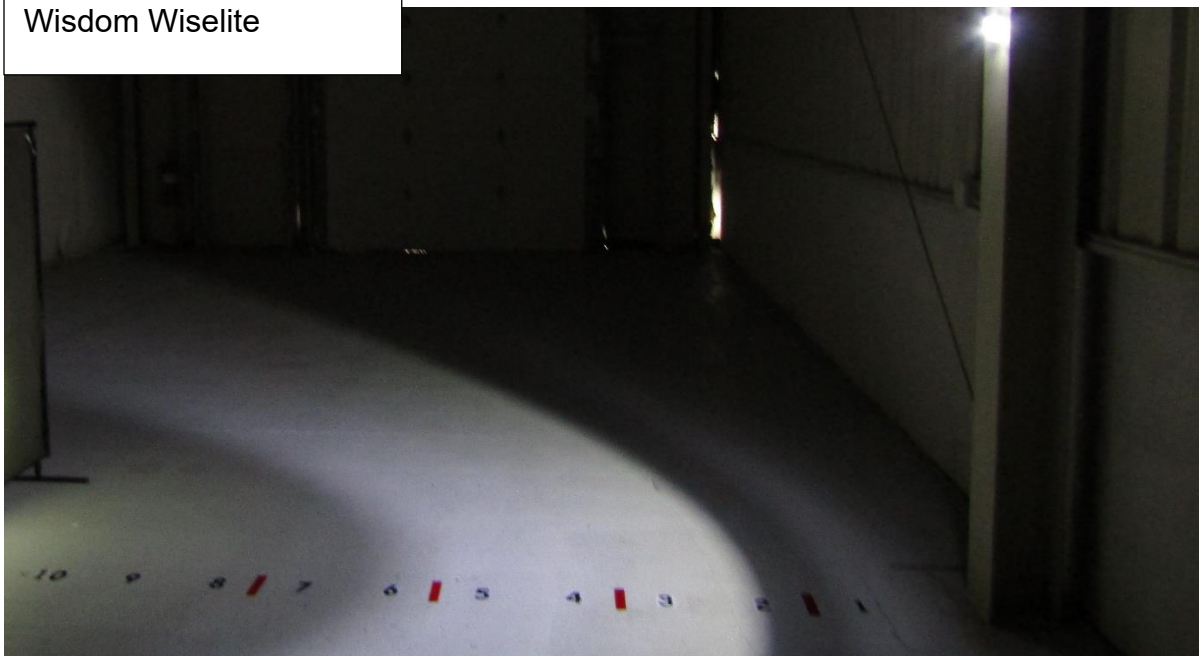
Ground Level Illumination Comparison

Summary: Wheat XL beam immediately illuminates ground level in continuous manner. Wiselite does not illuminate until beyond the 2 foot mark, and also clearly shows dark section from 7 to 10 feet.

Koehler WHEAT XL



Wisdom Wiselite



Limitations of Study: Study was performed in dark room environment, with screen set up to minimize reflection and bouncing of light off reflective surfaces. In real world environment, especially in underground mining, scatter and reflection of light will be greatly diminished, leading to dark areas appearing even darker.