

thrifty mockup.

by Eric Strandberg LC

When Lighting Consultant Ed Johanson approached the Lab to Mock-Up a proposed retrofit strategy that could save even more energy than the usual retrofit, naturally we were interested.

His client was a discount retailer, lighting their store using 8' two lamp fluorescent strips with two 8', 60 watt energy saving lamps and magnetic ballasts, (two, F96T12/CW/ES in this case). The fixtures are mounted end to end on 10' centers (between the store aisles). The usual retrofit upgrade for this kind of system is to convert the fixtures to use four, 4' T8 lamps and electronic ballasts (four, F32T8/741 in this case).

Below: this retail retrofit used fixtures with alternating numbers of lamps in each 4 foot section of an 8 foot long fixture. Note that the closer section has a single set of sockets while the farther section has two sets.



A retrofit like this is a good idea for a number of reasons. It improves light quality due to the tri-phosphor lamps and the non-flickering electronic ballasts. It also lengthens the maintenance cycle by going to a 20,000-hour lamp (from a 12,000-hour lamp). Additionally it increases the light output while saving energy, but not a lot of energy (from 123 watts nominal to 114 watts nominal).

Ed planned to use 8' fixtures with three 4' lamps (one lamp cross section, tandem with / a two lamp cross section). The fixtures would be mounted end to end so the result is; one lamp followed by two lamps, followed by one lamp, etc. The use of three 4' lamps per 8' instead, of two 8' lamps per 8' (or the usual four 8' lamps), will result in substantial energy savings. His concern however, was twofold. On the one hand he was concerned that the lamp reduction would result in unacceptably low light levels, and on the other hand that the alternation of one lamp to two lamps to one lamp again would result in uniformity problems with the light distribution. Another change was the addition of a reflector to the new fixtures, (the existing system used just plane strips), this would result in a higher percentage of light being directed down onto the merchandise. The proposed reflectors will have a 10% uplight component (the fixtures used in the mock-up had no uplight). Having some uplight is important to maintain overall room brightness, while controlling glare (you don't want bright fixtures against a dark background).



Above: lighting consultant Ed Johanson verifies light levels from the luminaires. It was important that both lighting and energy performance were verified. Using two rows of the new type (shown) and two rows of the old system, light levels from each system could be measured and compared.

The Mock-up consisted of half of the room with an installation of fixtures that are typical of existing conditions and the other half was the proposed solution. All the lamps were new, (but "burned-in" for 100 hours) so we measured initial footcandles. Following are some of the results that were gathered. Note the higher light levels, but lowered power levels for the three lamp system. Also note, that the T8 lamp has a higher percentage of maintained lumens than the T12.

If you would like to do a Mock-Up at the Lab please contact me at 206-325-9711 x28 or go to the Mock-Up section of Lighting Design Lab to get started.

Lamp	Nominal system Watts	Measured system Watts & (Volt/Amps)	Total raw lamp lumens; Initial (Mean)	Measured Foot Candles @ 48" AFF*, below center of fixture
(2) F96T12CW	123 watts	120 (127)	11,000 (10,120)	42
(4)F32T8/741	114 watts	Not available	11,400 (10,840)	Not available
(3)F32T8/741	93 watts	86.5 (87)	8,550 (8,130)	53

*Above Finished Floor