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NIGHT VISION 101: DIM IS BETTER

Ultra-modern cabin lighting is well and fine but pilots still need to understand the pitfalls of lighting that's either too bright or improperly directed. Pilots are often told to avoid bright lights while flying at night, or at least protect one eye. That's because the eyes' adaptation to darkness is an independent process in each eye. Moreover, night

vision can be temporarily impaired if the eyes are exposed to just one second of bright lighting conditions (think twice about turning the overhead spot light on

in flight). The exact mechanisms are unclear, but they include a biochemical process.

The retina of the eye contains cells, called rods and cones. The Rods are quite numerous and are found in the periphery of the retina (they also have a high sensitivity to light and are responsible for vision under very dim levels of lighting). The cones are located mainly in the center of the retina and are responsible for distinguishing color.

These receptors, which are stimulated by light, produce signals

that are then interpreted as vision. The rods in the eye contain an extremely light-sensitive chemical, called Rhodopsin. A brief exposure to bright light degrades Rhodopsin and the rod is unable to function. As a result, the Rhodopsin needs to regenerate during a long process that can take upwards of 45 minutes of absolute darkness to attain maximum sensitivity after exposure to bright light. This isn't exactly practical or possible in flight—especially sitting in front of bright cockpit screens. Keep in mind that the process of dark adaptation is approximately 80 percent complete after 30 minutes.

Using red lighting in the cockpit helps to preserve night vision, and manufacturers are smart to incorporate them into modern products. The obvious disadvantage, however, is that it's difficult to see red objects. Red light also requires more focusing power of the eye on near objects (the instrument panel, checklists and anything else that requires intense focus). This becomes more of a problem for pilots over the age of 40.

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