**Industrial LED lighting**

**Light and shade at the work bench**

**Underestimated but oh-so important – lighting is often neglected when it comes to developing the perfect design for an industrial work bench. This is surprising because ideal lighting conditions have been proven to benefit employees’ concentration levels, reduce error rates and ultimately increase productivity. Selecting suitable LED light fittings offers ergonomic advantages, too. By taking a few fundamental aspects into consideration, companies can enjoy the efficiency-boosting benefits of LED technology.**

Bad lighting conditions in industrial environments lead to fatigue, constrained or poor body posture and other health problems. Specific causes can be insufficient, excessive or dazzling lighting, flickering lights, too many shadows or overly stark contrasts. Ergonomically designed LED lighting, however, has a positive impact on employees’ output. The relative boost in performance depends on the type of work being carried out. For example, improved lighting helps to significantly increase efficiency when carrying out difficult tasks in particular. Moreover, good lighting improves employee safety in industrial settings. Better lighting in stairways and other hazardous areas helps prevent trips and other types of accidents, while an increased awareness of just how important lighting is in production will benefit both staff and the company alike.

**Tailoring lighting levels to the task at hand**

Various aspects need to be considered to ensure work benches benefit from ideal lighting. The first step is to analyse the current situation at the work bench. Ambient lighting must also be taken into account, as it is usually insufficient. Planners need to work with staff to analyse what exactly they need to be able to see to carry out their activities at the work bench. The next step is to select lighting equipment that exhibits the necessary illuminance – a measure of how much light reaches a surface. Illuminance of 300 lux is entirely sufficient when carrying out general activities or working with machine tools, for instance. In contrast, delicate and complex tasks, as conducted in electronics workshops, require at least 1,500 lux.

**Avoiding direct and indirect glare**

Bright light with high illuminance increases the risk of detrimental glare. Direct glare greatly reduces employees’ ability to concentrate as their eyes need to constantly adapt to different lighting conditions. Glare can be minimised with appropriate screening and by carefully directing light. “We use parabolic reflector grids in our item LED Light Fittings to eliminate hazardous glare almost entirely,” explains Marcus Geibel, an expert in work bench systems and a Product Manager at item, one of the world’s market leaders in building kit systems for industrial applications. “Conventional LED lights are often very bright. But it’s not the light that needs to appear bright, but rather the working area.” For example, when the lights are on, staff are barely aware of the lights, even though the working area is fully lit up. Direct glare is not the only issue – indirect glare causes eye strain, too. If mirrored or shiny surfaces create bright reflections in the work bench’s immediate vicinity, employees suffer from fatigue and find it harder to see what they are doing. It is important that staff can reposition industrial lights to tailor the lighting to their specific needs and the job at hand. In combination with other components from the item MB Building Kit System, joints on the LED Light Fittings enable staff to use light exactly how they need it. By arranging their work bench lighting to suit their personal requirements, they avoid developing a constrained or poor posture and do not suffer from fatigue while working. Extra dimmers may be appropriate to allow employees to regulate LED lights as they wish in order to satisfy their specific needs.

**Improved concentration thanks to even lighting**

Flickering lights cause stress and anxiety levels to rise. Those with sensitive eyesight can perceive flickering at frequencies as low as 50 Hz, which is why the frequency of LED lights should be considerably higher. The light colour, too, greatly influences how well employees can see at the work bench. While warm white light (approx. 2,500 kelvin) creates a calming atmosphere, cold white light (approx. 6,000 kelvin) has a stimulating effect. A light colour of 4,000 kelvin is recommended for industrial settings, and is perceived as pleasant. In a similar vein, the natural reproduction of colour also plays a key role. Working scenarios in which several overlapping shadows have an adverse effect on the process area are unpleasant and strenuous. The numerous spotlights incorporated into industrial lights are to blame for these hard ‘multiple shadows’, which create a chaotic pattern on the working surface and thus place employees’ eyes under a great deal of strain. This is where item comes in – the company uses high-quality LED technology and diffusor panels to ensure even lighting with soft shadows.

LED light fittings boast high performance and low energy consumption. Exhibiting a service life of up to 50,000 operating hours, the fittings require little maintenance and – in contrast to conventional lights – rarely need to be replaced. A modular lighting design is often a good choice for complex and sophisticated lighting scenarios. When using the building kit system from item, a work bench can be illuminated from three sides – without causing any shadows. In addition, simple plug-in connections dramatically reduce installation outlay and therefore offer the perfect lighting, even during complex assembly activities.

**Additional lighting tailored to employee needs**

A short while after the lighting concept has been implemented and the LED light fittings have been installed, it is advisable to bring all parties together to analyse the situation again. “Once the work bench has been in operation for one to two months, carrying out another evaluation definitely makes sense,” says Geibel. “For example, extra precision lighting is sometimes required to enable workers to do their job better.” In such cases, LED spotlights offer a good source of additional lighting. The extra spotlights even illuminate areas that the other lights fail to reach. Using the flexible, small yet powerful spotlights offers particular advantages when it comes to very fine details, which is relevant during tricky assembly work or when inspecting surfaces during quality assurance checks. Furthermore, the high-quality lenses in illuminated magnifiers help employees get a much closer look at well-lit areas.

**Improved wellbeing, improved productivity**

Industrial work benches can be enhanced with high-grade LED light fittings. An ideal and ergonomic light design boosts employees’ ability to concentrate, thus ensuring high productivity. Fatigue and other health problems are avoided, and error rates drop. Creating the perfect conditions to allow workers to rapidly read screen displays without making mistakes and carry out complex assembly tasks reduces process times and increases productivity.

Image captions:

* Hazardous and distracting lighting effects can be corrected with a modular approach using LED lights. (Photo: item)
* Productivity is heavily dependent on the quality of work bench lighting, notably in the case of complex tasks. (Figure: Lichtkultur GmbH, Dresden)
* Additional light fittings with powerful spotlights can prove helpful during assembly, quality control and all other tasks where details really matter. (Photo: item)