

Outdoor enclosures help protect bees with housing for hive monitoring device

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Endangered in Britain, the preservation of bees is vital. Balancing the right temperature and humidity within the hive is crucial, so monitoring these conditions is important in understanding how to protect our bees. One engineer with a passion for beekeeping has turned his attentions to creating an electronic sensor that is durable enough to survive through a winter in northern Scotland. He turned to Spelsberg to provide the casings that will ensure long-term, reliable monitoring.

Pollinating trees, plants, and crops which are essential to the preservation of our environment and food supply, bees are vital to global ecology. Since the 1970s, the UK's bee population has been declining, and to address the potential for environmental catastrophe, initiatives such as the Department for Food, Environment, and Rural Affairs' (DEFRA) Healthy Bees Plan 2030¹ have been launched.

Measures to reverse the bee decline has also received commercial and agricultural support, and the areas cultivated with insect-pollinated crops has increased by over a third since 1989². As well as their care for the insects in their own right, beekeepers have a vested interest in the health of hives for the production of honey, especially if scaled to commercial level.

Ensuring the increase of the bee population requires optimum conditions within the hive, including temperature and humidity. If a honeybee hive is too cold, bees can die, potentially resulting in the loss of the entire hive should the queen succumb. Meanwhile, humidity can cause condensation, which can not only give rise to fungus and rotting, but cold water droplets can also kill the bees.

Near Ellon in Aberdeenshire, a number of hives are under the care of bee preservation enthusiast, Rae Younger. North Scotland suffers shorter summers than most of Britain, which gives the bees less time to make the honey that they will rely on for energy during the long, cold winters. In this climate the health of the hive is more important than ever.

Rae has been developing a monitoring device that will give round-the-clock notifications on hive health. The device includes electronic sensors and a microprocessor so, like the hives it is monitoring, the device needs protection against tough Scottish winters and defence against inquisitive wildlife.

“I’d previously used Spelsberg enclosures for my day job in the Oil and Gas industry and was very impressed,” says Rae. “They were resilient enough to keep the weather out and guard against impacts, while being lightweight and easy to install. Further, the company was able to offer customisation and engineering support, which made them excellent value.”

With five hives and a monitoring device for each, Rae has used a Spelsberg TG enclosure, providing IP67 protection against driving rain and snow, as well as IK08 impact resistance. The compact enclosure, measuring 122mm by 82mm, houses temperature, humidity, and pressure sensors. A microprocessor commands a signal, every 15 minutes, that transmits via LoRa, a long range, low power radio modulation technique, with a separate antenna. Back at base, around a mile away,

the LoRa signal is received, giving 24/7 remote monitoring. If required, LoRa can transmit up to 10 miles. The unit is also powered by four, 8650 lithium ion rechargeable batteries.

Like many beekeepers facing colder climates, Rae uses a polystyrene-based hive, rather than a traditional wooden design. If the monitoring device signals that the temperature is dropping, vents can be closed and, if required, insulation can be added to the hive to retain heat. Meanwhile, if humidity is increasing, vents can be opened or replaced with permeable alternatives to allow moisture dissipation.

“The enclosures are also fast and easy to install, with a clever, quarter-turn screw that enables fast access and closure of the cover,” says Rae, who has installed a clear lid to enable visibility of the status LED.

Equipped with CAD drawings, downloadable from Spelsberg’s website, Rae has designed and installed his own custom bracket to seat the device’s sensors, simply fitting within the enclosure’s internal mounts. While the initial hive monitoring device prototypes are undergoing field validation, Spelsberg’s in-house CNC customisation engineers are available to scale up production as required.

“Existing monitoring devices are available, but they are typically powered by solar energy,” says Rae. “This can add significant size and cost, compared to the battery option, which runs for nine months before recharge is needed. Other devices also transmit via SIM card, but this increases ongoing costs compared to using LoRa.”

As hive theft is a rising issue, Rae has also fitted a GPS transmitter to each device, meaning the location of each hive can be tracked wherever it is.

“The monitoring devices will help ensure that hives and their populations remain healthy, year-round. Spelsberg’s enclosures provide the vital protection to enable the device to operate, whatever the conditions, trouble-free.

¹<https://www.gov.uk/government/news/defra-launches-the-healthy-bees-plan-2030-to-help-protect-honey-bees>

²<https://www.rsb.org.uk/policy/policy-issues/environmental-sciences/bees>

Image captions:



Image 1: Outdoor enclosures help protect bees with housing for hive monitoring device



Image 2: Spelsberg TG enclosure, that ensure long-term and reliable monitoring.



Image 3: Pollinating trees, plants, and crops are essential to the preservation of our environment and food supply, bees are vital to global ecology.

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About Spelsberg

Spelsberg is one of the largest manufacturers of electrical enclosures in the world. With over 4,000 enclosures available as standard and further customisation possible, it offers solutions for almost any application.

With the largest supply of non-metallic enclosures, ex-stock in the UK, its products are often available for delivery within 24 hours; customisation is possible on any product, including bespoke entries, engraved corporate logos or fitted terminals, within 48 hours. Products can be ordered direct from Spelsberg or from most leading supply specialists including RS, Rapid, Farnell and CPC.

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