
Save Over £170,000 in 2 Years with Automated Coin Cell Assembly

Executive Summary

Battery R&D labs face mounting pressure to improve efficiency, reduce costs, and increase data quality. The Cellerate Cell Assembly & Sealing System (CASS) offers a proven return on investment, with potential savings of over £170,000 in just two years. By automating coin cell assembly, labs can dramatically cut labour costs, reduce material waste, eliminate training inefficiencies, and redeploy staff to more valuable work.

This paper explores how Cellerate delivers these savings, while addressing common objections to automation investments.

How Cellerate Delivers Savings

1. Labour Cost Savings: More Cells, Less Time

One of the most significant advantages of automation is the dramatic reduction in labour hours spent on cell assembly. A fully manual process, including setup, batch preparation, and clean-down takes approximately a full day's work per 50 cells, whereas automation reduces this to just 1.5 hours. At 150 cells per week, this equates to an annual labour saving of £37,440, (*Calculation in Appendix 1*).

While some labs believe their manual process is already optimised, with automation, throughput becomes even more predictable, eliminating unnecessary delays and maximising productivity.

2. Training Costs: The Hidden Expense

Training new staff for manual cell assembly is costly and time-consuming. It takes 8 weeks to train a technician to become proficient in manual coin cell assembly, with a weekly wage of £1,600 (£40 per hour for 40 hours). The total cost to train one technician is £12,800.

In contrast, Cellerate's system requires just 1 hour of training at a cost of £40. Therefore, the training cost per technician is reduced by £12,760 (£12,800 - £40) when switching to automated assembly.

If a lab trains 3 technicians annually, including new hires and retraining due to turnover or upskilling, the total annual training savings amount to £38,280 (£12,760 x 3), (*Calculation in Appendix 2*). This highlights the significant savings, especially when considering the costs of technician turnover and ongoing training.

3. Reducing Staff Turnover & Improving Retention

Manual cell assembly is repetitive, physically demanding, and prone to human error, which can contribute to technician fatigue and high turnover rates. Skilled operators often seek more engaging roles, and replacing them incurs recruitment costs, retraining time, and months of reduced efficiency.

By automating the most tedious aspects of assembly, labs can utilise their technical staff for higher-value tasks, improving job satisfaction and retention. Even in stable teams, the loss of a highly skilled assembler could take months to recover from, whereas automation ensures consistent quality, regardless of who is operating the system.

4. Standardising Quality & Maximising Research Output

Achieving consistent cell quality is difficult when relying on individual expertise. In a manual process, only the most experienced assembler can consistently produce the best-quality cells. If that person leaves or is reassigned, battery labs may experience a drop in quality, therefore, impacting research outcomes.

Given that the salary difference between a top assembler and a general technician can be £30,000 per year, automation eliminates reliance on key individuals by ensuring every cell meets the same high standard, regardless of who is operating the system. Battery labs that automate are not just improving today's processes, they are future-proofing against risk and scalability challenges.

5. Reducing Material Waste from Defective Cells

Material waste is a significant concern in battery R&D, especially when defective cells are produced. The materials cost for these defective cells is approximately £10 per cell, but the main savings come from reducing the number of cells you need to produce in the first place.

Traditionally, labs may produce 5 cells per material to ensure reliable data, even though many of those cells may be discarded due to inconsistency. With Cellerate's automated system, the data becomes more consistent, allowing labs to test fewer cells, typically 3 cells per material rather than 5. This reduction means that labs can aim to produce 90 cells per week instead of 150, leading to significant material and testing savings.

In terms of material waste reduction, automation leads to an estimated £12,480 in savings per year by producing fewer defective cells. This is based on producing 36 fewer defective cells per week, saving £240 per week, and £12,480 per year in material costs, (*Calculation in Appendix 3*).

6. Competitive Advantage: Better Data, More R&D Impact

In an increasingly competitive research landscape, the opportunity cost of allocating skilled personnel to repetitive assembly tasks instead of high-value research cannot be ignored. Automation enables scientists and engineers to focus on data analysis, material optimisation, and new discoveries, rather than spending hours assembling cells manually.

While some labs remain comfortable with manual assembly, the real question is whether it is the best use of their team's expertise. Automation provides a direct pathway to higher throughput, more reliable results, and faster material validation, giving forward thinking labs the competitive edge they need to stay ahead in battery innovation.

7. The Bottom Line

The financial impact of automation extends far beyond initial time savings. When factoring in all of the above, the cumulative savings are substantial. Below is a breakdown of the estimated annual savings a lab can expect by implementing Cellerate's automation:

Category	Annual Savings (£)
Labour Cost Savings	£37,440
Material Waste Reduction	£12,480
Training Cost Savings	£38,280
Total Annual Savings	£88,200

These savings grow even further when scaling up production or integrating additional Cellerate modules. Labs that automate not only reduce operational costs, but also increase research throughput, improve data quality, and accelerate material validation

8. Additional Opportunity to Save £500k Annually

Improving the quality of cells uncovers the opportunity to test fewer cells, which can save more money than you might expect. For example, with automation increasing the reliability of your data, you could reduce the number of repeat measurements needed. Instead of testing 5 cells per sample, you could test just 4, significantly lowering the number of cells required for each data set.

For a lab testing 30 samples per week, this could result in savings of £12,000 per week, thanks to a more efficient use of resources and equipment (*Calculation in Appendix 4*). This represents a substantial opportunity to improve both financial productivity and operational efficiency.

Why Wait?

Cellerate CASS is not just an automation tool, it is a strategic investment that protects against skill gaps, improves research efficiency, and ensures top-tier data quality.

Visit www.cellerate.co.uk to learn more.

Appendix

1. Formula: Labour Cost Savings

Manual Process:

- It takes 7.5 hours to assemble 50 cells manually.
- The technician's wage is £40 per hour.
- The lab produces 150 cells per week.

Automated Process:

- Automation reduces the time required to assemble 50 cells to 1.5 hours.

Manual Process Labour Costs:

- Time required for 150 cells: $150 \text{ cells} / 50 \text{ cells} \times 7.5 \text{ hours} = 3 \times 7.5 \text{ hours} = 22.5 \text{ hours per week}$.
- Labour cost per year: $22.5 \text{ hours/week} \times £40/\text{hour} = £900 \text{ per week} \times 52 \text{ weeks} = £46,800 \text{ per year}$.

Automated Process Labour Costs:

- Time required for 150 cells: $150 \text{ cells} / 50 \text{ cells} \times 1.5 \text{ hours} = 3 \times 1.5 \text{ hours} = 4.5 \text{ hours per week}$.
- Labour cost per year: $4.5 \text{ hours/week} \times £40/\text{hour} = £180 \text{ per week} \times 52 \text{ weeks} = £9,360 \text{ per year}$.

Labour Cost Savings:

- Savings per year: $£46,800 \text{ (manual process)} - £9,360 \text{ (automated process)} = £37,440 \text{ per year}$.

2. Formula: Training Costs

Manual Cell Assembly Training:

- Assumes it takes 8 weeks to train a technician to become proficient at manual coin cell assembly.
- Technician wage is £40/hour.
- Weekly cost per technician: $40 \text{ hours} \times £40 = £1,600$
- Cost to train one technician: $8 \text{ weeks} \times £1,600 = £12,800$

Cellerate System Training:

- Takes just 1 hour to learn basic operation.
- Cost to train one technician: $1 \text{ hour} \times £40 = £40$

Training Cost Saved per Technician:

- $£12,800 - £40 = £12,760$.

Annual Cost Savings from Training 3 Technicians:

- $£12,760 \times 3 = £38,280$

3. Formula: Reducing Material Waste from Defective Cells

Original Process (Manual Assembly):

- To ensure reliable data, labs produce 5 cells per material.
- With automation, only 3 cells per material are needed.
- That means 2 of every 5 cells (40%) are unnecessary.

For a weekly production of 150 cells, the wasted proportion is:

$$150 \times (5-3) / 5 = 150 \times 0.4 = 60 \text{ wasted cells/week}$$

At £10 per cell, this equals £600 of material waste per week.

Automated Process:

- Weekly production drops to 90 cells (since fewer repeats are needed).
- The same 40% factor applies.

Therefore:

$$90 \times (5-3) / 5 = 90 \times 0.4 = 36 \text{ wasted cells/week}$$

At £10 per cell, this equals £360 of material waste per week.

Material Waste Savings:

$$£600 - £360 = £240 \text{ per week}$$

$$£240 \times 52 = £12,480 \text{ per year}$$

4. Formula: Additional Opportunity to Save £500k Annually

Original Process:

- 5 repeat measurements per sample.
- 30 samples tested per week.
- 150 cells tested per week (5 repeats x 30 samples).
- Cost per cell to test: £400*

Improved Process (with Automation):

- 4 repeat measurements per sample (instead of 5)
- 30 samples tested per week
- 120 cells tested per week (4 repeats x 30 samples)
- Cost per cell to test: £400*

Testing Savings:

- Cost of testing 30 fewer cells per week: 30 cells x £400 = £12,000 per week.
- £12,000 x 50 weeks = £600,000 per year.

*£400 cost per cell is based on feedback from industry experts, as well as industry-standard cell testing services, where prices typically range from £1,040 to £1,200 per channel (source: SoCal Research Lab).