

## **Tales from the workshop: I**

### **A hydrostatic drive on each of the wheels**

After Marko left the Le Strange Arms to go to set up for his underwater training session at Brindlecliffe's swimming baths Bill picked up his briefcase and walked the short distance home. Tuesday evening was sausage, peas and mash night. He was aware other people did not stick almost rigidly to the same menu each week. But he much preferred to stay by his familiar routine. Any changes were, well, unsettling.

But, although everything about his routine went as usual, he was still slightly unsettled. Not too seriously. But he was pondering over Marko's suggestions that the workshop might request the money to build a tram loco based on the three-foot gauge Giant's Causeway ones. Which were very similar to standard gauge tram engines which were built for other tramways, such as the Wisbech and Upwell line which was made famous by Reverend Wilbert Awdry.

Now this was not what was unsettling him. It was a very positive response to his tentative suggestion. And Bill understood why Marko, the Operations Manager, had requested that this would have to be an internal combustion engine rather than the steam boiler and cylinders of the originals. The wooden structure around tram locos with a skirt almost to track level – originally introduced to prevent the flames from the boiler and the steam from the pistons causing horses to bolt – would hide whatever propulsion arrangements were inside. But Bill was a lifelong steam locomotive engineer. And the thought of having to devise a locomotive with an internal combustion engine was outside his comfort zone.

But Bill also knew from overhearing conversations – and the occasion request to use the workshop's machinery to adapt or make spares – that several of the volunteers did have experience of restoring and repairing cars. At least a couple of them were capable of leading a project to design and construct Marko's loco. Although neither had been given that level of responsibility previously. And might not want to, if asked.

There was no other option, Bill concluded, but to have a chat with one or more them. With luck he could catch them at their lunch break and engage them in conversation.

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Just two days later Bill was up in his small office on the mezzanine when he heard several familiar voices down in the workshop. One of the big lathes then started up and the banter stopped. Bill stepped out onto the small landing at the top of the stairs. Sure enough, he was right. All the volunteers he knew to be skilled with cars were down there. Probably no coincidence that they chose the same day to help out, Bill thought – there was certainly some deeply-rooted camaraderie among them.

It was difficult for Bill. He spent the next half-an-hour seriously unsettled. He was so accustomed to eating his cheese and pickle sandwiches in his office, away from anyone else, that he was almost trembling when he walked down the stairs with his sandwich box in his hand. ‘Do you mind if I join you for once?’ asked Bill of the volunteers, who were sitting or leaning on old packing cases and nearby workshop equipment.

‘Blimey, Bill, has the revolution come?’ asked Jeff, who may well have been the most ‘senior’ of the team – after Bill himself – in terms of how long he’d been volunteering. ‘Not like you to come down from your roost to mix with the likes of us.’

‘Not exactly.’ Bill paused. He was still unsure how to start the conversation. He decided to pick up on Jeff’s overstated question. ‘But Marko has made a suggestion which, at least for me, is almost like having to deal with a revolution. He wants the workshop to design an internal-combustion powered locomotive.’

Lots of mock ‘Oohs’ and ‘Surely nots’ came from all the volunteers. ‘A very big revolution indeed’ quipped one of them.

‘Well, it’s been done before, that’s for sure,’ joshed Jeff. ‘But not here, equally for sure. Apart from the sheer idea of a loco which isn’t powered by steam, what’s the problem Bill?’

‘Well, yes the idea is a little difficult for me, Jeff,’ responded Bill. ‘But needs must and all that. The problem is that over the years I’ve learnt a certain amount about steam locomotives. But I have never had any experience with other types.’

‘And by “a certain amount” you mean more than the rest of us put together, don’t you Bill?’ replied Jeff, smiling. ‘Well some of us here know about internal combustion

engines – though only when the wheels have got rubber tyres on them, not flanges. Tell us what Marko's got in mind and let's see if we can come up with something.'

Bill explained that the idea was to have a locomotive which would quickly start and both be capable of going out to recover a broken-down steam locomotive and its carriages – greeted with 'Don't be ridiculous, our locos never break down' which was countered by 'Not very often anyway' – and also to shunt vehicles at the workshop and carriage sidings. There were several serious expressions of agreement to the effect that such a loco was certainly needed as *Sir Toby* took too long to get steam up and was prone to wheel spin when trying to pull any sort of load.

Bill then said that the original idea was for a tram loco. And so what was inside the wooden bodywork would not be seen. Again there was agreement that this was much better than designing something that looked like a diesel shunter.

Jeff said it had been done before at the Wells and Walsingham Light Railway and several volunteers confirmed that they'd seen that. But it hadn't been reliable and a better thought-out drive system might have prevented many of the problems.

The speed at which everyone's sandwiches were eaten slowed down considerably as ideas went to and fro. But the general consensus was that the loco needed to be heavy for its size to be able to transfer enough power to the wheels – hefty steel sideframes and over-spec spacers between them would help there. A car engine could be converted easily to LPG, which would be easier to transport to the loco than either petrol or diesel – and would give off far less fumes. An automatic transmission would remove most of the problems of driving it. But that left the tricky issue of whether to use a locked-down differential to get the power to one set of wheels and con-rods to link to the other set of wheels, or whether to go for a complex set of chains and sprockets.

But the presence of sand on the St Torpid's Bay track meant that chains and sprockets might wear too quickly. It was the key weakness with the Wells and Walsingham engine, and that didn't run so close to a beach. Yet con-rods added a whole new complexity to the wheel construction.

Andy had remained almost silent up to this moment, although had clearly been following the to-and-fro suggestions with considerable interest. 'How about,' he

chipped in, 'if we use an engine already designed to run on LPG? Such as one from a forklift truck.'

There was a general murmur of assent and nodding of heads. 'And that way we can also drive an hydraulic pump.' The response was mostly silent quizzical looks. Jeff just asked 'Why?'

'That way', replied Andy, 'we can put a hydrostatic drive on each of the wheels. And an easy-peasy control knob for the driver. And don't forget the motor then also acts as the brake, simplifying the whole construction.'

A stream of rather tentatively approving utterations progressed around the lads. 'Certainly gets around almost all the problems of sand getting in the wrong places,' observed Andy.

'Sounds good in principle. And I don't want to pour any cold water on the idea. But won't that be rather expensive?' responded Jeff. Bill was just sitting back, very pleasantly surprised at just how well the chat was going.

'Not if we can pick the parts up second-hand. Or ask someone who deals in used forkies if he can help out,' replied Andy.

'Such as?' came back Jeff.

'My mate Peter. I expect he'll be at the match on Saturday afternoon. I'll ask him. He runs a business the other side of Wisbech repairing forklifts. And he goes to the machinery auctions to see if any of the forklifts are worth picking up to strip down for parts. Sometimes there's so many at an auction they get knocked down for next to nothing.

'What made me think is because he said a couple of weeks back that a five tonne lifting capacity hydrostatic drive Komatsu went for silly money – and I mean silly not-a-lot – at an auction because it was bigger than anyone bidding was really interested in buying. And maybe because no one was that interested in the hydrostatic drive – it's not a lot of use buying it for spares as almost all the ones in use are leased, not privately-owned.'

Jeff looked at Andy and then Bill. 'Bill, have you any idea how much money is on the table to build this?'

'Well, Jeff,' Bill tentatively responded. 'It's not got anything like that far. All that's happened is that Marko has asked me to prepare some budget costs. As I understand he will then ask the management if he and I can give a short presentation. Marko clearly thinks there are good operational reasons to have this – and perhaps a couple more coaches as well – but that's for him to propose, not me.'

'Only if the management agree that it's a good idea will it go any further. And then the big step will be to see if there's any money in the budget for the next financial year. And I have no idea whether there might be, or how much it might amount to.'

'OK, so we're really just at the "optioneering" stage,' summarised Jeff. He continued by stating 'I'm happy to cost up the probable costs of something based around a car engine, automatic gearbox and – most probably – an adapted differential. But I'll pencil in some figures for the sprocket and chain option while I'm at it. Andy, any chance you could ask Peter how much he might need to pick up a hydrostatic drive forklift? Don't suppose it matters if its Komatsu or Toyota or whoever. I might need to talk to Peter about the finer points of putting it all together – especially adapting the controls – but can't be rocket science. Or NASA budgets. How does that fit in with what you had in mind Bill?'

'Well Jeff, I have to say it "fits in" rather better than I had expected when I came down a few minutes ago. I am, of course, very grateful to you all for the suggestions.'

Andy made the helpful observation that if they bought a complete forklift truck then, after they had stripped off what was wanted for the locomotive, there would be plenty of spare parts which could be sold back to Peter or someone else. The forklift part on its own would be a useful item. Andy offered to get some feedback from Peter about how that might work.

'I take it Bill that you have a good idea how much a set of wheels will be, based on previous projects?' Bill agreed. 'That just leaves one other thing I'll need help with though,' Jeff continued. Bill simply asked what that might be. 'I'll need to talk turkey with the steel fabricators we use to get some idea of how much the sideframes and

other chassis components might set us back. I've no experience of costing up fabrication work – you've always done that before.'

'Well, might it be easier if I do a quick sketch and talk to my contacts at BKG?' asked Bill. 'After all the chassis is going to be about the same no matter what engine or drive we decide to use. The only difference is likely to be how many fixing holes and where they need to be drilled.'

'Here's hoping the costings fit in with whatever budget can be made available. I'd really like to take this on,' Jeff responded. Yet again there was general agreement and a few 'If onlys'.

Bill thanked everyone again. All the lunch things began to be tidied away so the volunteers could resume their previous tasks. Bill went back up the stairs to his office far more 'settled' than he had been since the previous evening. Yet again they'd demonstrated just what a talented – and well-connected – group of volunteers he had in the workshop.

### **Disclaimer**

The author knows nothing about the problems with the Wells and Walsingham locomotive – other than in 2019 the chain and sprocket needed replacing. The suggestion that this vehicle might have design weaknesses is for the purposes of this fictional tale only.