

## SECOND WORLD WAR BRITISH AIRBORNE FORCES BATTLEFIELD MOBILITY

By Claude VILLENEUVE

### British Airborne Forces: The creation

From the debut of the Second World War, Nazi Germany saw the military potential of the employment of the airborne troops. The successful airborne assaults by German Fallschirmjäger during the Campaign of Norway (9 April to 10 June 1940), the Battle of France (10 May to 22 June 1940), and on Fort Eben Emael in Belgium on 10 May 1940 attracted the attention of British Prime Minister Winston Churchill. On 22 June 1940 he ordered the formation of Britain's own airborne capability<sup>1</sup>.

### British Airborne Forces: Ground mobility

What made the creation of Airborne Forces (parachute and gliderborne organizations) in the Second World War so attractive was their unique capability to deploy on very short notice to drop zones (DZ) in almost any theatre of operation to seize or destroy strategic objectives such as airfields, bridges, or footholds. However; a draw back from that capability is the limited ground tactical mobility. Once on the ground, the airborne unit is truly a light unit and becomes foot mobile. Eventually, the unit's "logistics tail" will reach the unit and will include some light vehicles which, when brought, are limited in number and capability<sup>2</sup>. Acknowledging this shortcoming, the British doctrine for airborne operations clearly specified that: "*It is important that they should be used for tasks where: (c) Motorized mobility is not needed.*"<sup>3</sup>

Whilst the constraint on "motorized mobility" was obvious the need for some ground tactical mobility remained. Recognising this need in his history of the British Airborne Forces during the Second World War, Lieutenant-Colonel T. B. H. Otway, mentioned to that effect that<sup>4</sup>:

*"Some form of cross-country vehicle capable of being carried in a Horsa, and if possible of being dropped by parachute as well, had to be found to provide mobility for key personnel, signals and weapons. The existing heavier vehicles of the Army were too big for the Horsa, and light cars of the Austin Seven type were not sufficiently powerful."*

*"Apart from the jeep, and until the Hamilcar Glider became available, there were no other four-wheeled airborne vehicles but large numbers of light and a proportion of heavy motor-cycles were included in the Division. An*

---

<sup>1</sup> Public Records Office (PRO) CAB 120/262, letter from PM Winston Churchill to General Sir Hastings Ismay (Chief of Staff to the Minister of Defense) for the War Office dated 22 June 1940

<sup>2</sup> Tugwell, Maurice, Airborne to battle: a History of Airborne Warfare, 1918-1971, London, Kimber, 1971, 367 pages, ISBN 0-7183-0262-1

<sup>3</sup> 26 GS Pub 919 - Airborne Operation Pamphlet No 1 1943 (Provisional), The War Office, May 1943

<sup>4</sup> Lieutenant-Colonel, Otway, T. B. H., The Second World War, 1939-45, Army: Airborne Forces, London, Imperial War Museums Department of Printed Books, 1990, 468 pages, ISBN 0-9016-2757-7 Chapter V, Airborne Forces in the United Kingdom, November 1941-April, 1942, paragraph 13 b) Vehicles, page 46

*ultra-light folding motor-cycle was also developed to drop by parachute in a container.”*

### The “ultra-light folding motor-cycle”: the Welbike

The Welbike was an air droppable, ultra-light, folding, single-seat, motorcycle used by British Forces during the Second World War. The Welbike has been developed by the direction of Station IX of the Special Operations Executive (SOE), the "Inter Services Research Bureau" based at Welwyn, an hour north of London in Hertfordshire. Not much used by the SOE, they were issued to the British Airborne Forces and the Royal Marine Commando.

The Welbike was powered by a Villiers Junior de Luxe 98cc (6.0 cu in) single-cylinder 2-stroke petrol (gasoline) engine which generated 1.5 horsepower. With full tanks totalizing 6.5 imperial pints (3.7 L; 7.8 US pint) of “petroil” (mixed of petrol and oil at a ratio of 16:1), the Welbike can travel a distance of 90 miles (145 km) at a speed of 30 mph (48 km/h). Because the feed point of the tanks is located at the bottom of the off (left) side fuel tank, and is lower than the carburettor, the Welbike had to be pressurised occasionally by a hand pump built into the near (right) side tank. The Welbike had rear brake only, no suspension, and no lighting system.



Figure 1 - Excelsior Motor Company

The Welbike was manufactured by Excelsior Motor Company, based in Coventry. Excelsior built 3,841 machines over three contracts between 1942 and 1943. A fourth contract for 1,241 was later cancelled. The first 1,200 units were known as MkI. The second contract of 1,400 machines and the third contract of 1,241 machines were called MkII. The difference between the two was that the MkII saw the addition of a rear mudguard, a splash shielding between the tanks, and a proper filler cap (on the off side tank) that didn't require the removal of the pump (on the near side) to fill the fuel tanks.

### The Welbike: its distribution within a Parachute Battalion

The Welbike was part of the airborne equipment and included in the Schedule of Equipment.<sup>5</sup> Its purpose was described as follow:

*“Lightweight folding motorcycle. Designed to increase the restricted mobility of Parachute Troops, and can be dropped folded in RAF Mark I Container.”<sup>6</sup>*

<sup>5</sup> Schedule of Equipment peculiar to Airborne Forces, Serial S/72 “Lightweight motorcycle (Scooter) to be supplied by the Ministry of Supply (M of S)

<sup>6</sup> Library and Archives Canada, RG24-G-3-1-a, “69-1-69/SD HQ First Cdn Army, Report Number 5 on Airborne Division (11 Mar – 8 Apr 43) Annex A, Note on Airborne Equipment”

The Welbike was distributed as per the War Establishment (WE) Tables. The distribution was identical for both British airborne divisions: the 1<sup>st</sup> and the 6<sup>th</sup>. Although the tables called for the “*Motorcycles, Solo (125 cc) complete with dropping cradles*” a footnote indicates that: “*if motorcycles, solo, 125-cc complete with dropping cradles, are not available then motorcycles, folding will be used in lieu*”, the “*motorcycles, folding*” being the Welbike. IAW War Establishment (WE) its distribution within a Parachute Battalion was as follows:

- British Parachute Battalion<sup>7</sup>:
  - Battalion Headquarters: four.
  - Headquarters Company: total of 11 as follows:
    - Mortar Platoon (two platoons); two each for a total of four;
    - Anti-tank and anti-aircraft Platoon: four; and
    - Administration Platoon: three.
  - Rifle Companies: one per Rifle Company Headquarters for a total of 3.
  - Total per Parachute Battalion: 18.
- Canadian Parachute Battalion<sup>8</sup>: as per the British Parachute Battalion.

So if a “*Motorcycle, Solo (125 cc)*” wasn’t available within a unit it was to be replaced by a “*Motorcycle, Folding*” (Welbike). Therefore; it is quite difficult to say how many Welbikes were actually used within the British Airborne Forces during the Second World War.

#### The Welbike: Air droppable

The Welbike was designed to be air droppable. The dimensions of the Welbike when closed were:

- Height: 15 inches;
- Width: 22 inches;
- Length: 52 inches; and

---

<sup>7</sup> War Establishment (WE) I/241/1, A Parachute Battalion (1944), Notified in Army Council Instructions (ACIs) 22nd March 1944, Effective date 28th February 1944 superseded by WE I/241/2, A Parachute Battalion (1944), Notified in ACIs 28th March 1945, Effective date 15th March 1945

<sup>8</sup> WE Cdn III/127/2, A Canadian Parachute Battalion, Approved under COS 139, Effective date 19th May 1944

- Weight: 70 pounds (empty tanks).



**Figure 2** – Welbike MkII C5153148 folded (C Villeneuve)

A green painted and marked with white letters “Motor Cycle” Container Light Equipment (CLE) MkI was used to drop the Welbike. Before the drop, the fuel tanks were pressurized, and the handlebars and seat were folded away. The Welbike was then packed into the container with the rear wheel at the base of the container, which had a percussion dome to minimise damage on landing.



**Figure 3** - Welbike Mark I motorcycle in a CLE MkI airdrop container (IWM H 27061)

Once the container was opened, the paratrooper twisted the handlebars into place, pulled the seat up, folded out the foot-pegs and push-started the bike into action. The Welbike was designed to be unpacked and ready for action within 11 seconds.



**Figure 4** - Paratroopers retrieve a Welbike (lightweight folding motorcycle) from an equipment container on the drop-zone, during Exercise Mush, 22 April 1944 (IWM H 37733)

### The Welbike: Wartime use

The SOE quickly decided that the Welbike didn't meet their operational needs and only few were used by them. Consequently; the Welbike ending up with the Airborne Forces and the Royal Marine Commandos hoping the machine would be more suitable for their operations. The Welbike was used during training exercises in United Kingdom. The Welbike saw action during Op TONGA (airborne portion of Operation OVERLORD) 6-7 June 1944, and Operation Market (airborne portion of Op MAKET-GARDEN) 17-27 September 1944. However; while there was a possibility that the Welbike was dropped during Operation VARSITY (airborne portion of the crossing of the Rhine River), the lack of access to Load Tables didn't permit to confirm its use.



**Figure 5** - Sergeant Gordon Davis of the 1st Canadian Parachute Battalion, riding a Welbike Mkl lightweight motorcycle used by airborne forces, Carter Barracks, Bulford, England, 5 January 1944 (PA-179148). Sergeant Davies was killed in action (KIA) on 19 June 1944.

### The Welbike: After all, the good idea wasn't such a good one!

There were some issues with the Welbike<sup>9</sup>. The first one was the difference in weight between a paratrooper and the Welbike. This means that the two often landed a great distance apart. The second issue with the Welbike was its lack of power coupled to the small 12 inches wheels, and that there was no suspension. These made the Welbike all but useless for riding across fields and other rough terrain. Finally, the development of the Horsa and Hamilcar gliders that could fit not only soldiers but 5-cwt 4x4 cars (jeeps) and full-size motorcycles like the 126 cc air-cooled two stroke single Royal Enfield WD/RE (nicknamed the Flying Flea) sounded the death knell of the Welbike.

---

<sup>9</sup> Weeks, Jones, Airborne Equipment, A History of Development, Davies & Charles Publishers Limited, London, Vancouver, Newton Abbot , 1976, 191 pages, ISBN 0-7153-7117-7



Welbike MkII C5153148



Figure 6 – Welbike MkII C5153148\_after restoration in April 2017 (C Villeneuve)

I acquired Welbike C5153148 in February 2017 from a gentleman from Richmond, British Columbia, Canada who never had it running since he acquired it. One of the first to sit on it in Canada was a neighbour of the former owner from Richmond. The individual was a Second World War veteran who fought in Arnhem in September 1944 with the... Fallschirmjäger!

The Welbike was part of the Contract 294/23/S 1649 dated 19 November 1942 for 1,400 Welbike. Frame numbers were from 1214 to 2613. War Department Census Numbers were from C5152014 to C5153413. They were to be received between February 1943 and 14 March 1943 at a rate of 400 a month. As a matter of interest it is indicated that "302 m/cycles to be boxed for export by 6-5-43" (more to follow on this...)

0 4 3 2 1 0   5 4 3 2 1 0   5 4 3 2 1 0   5 4 3 2 1 0	THOUSANDS	HUNDREDS	TENS	UNITS	
D2/5031					CR 2
CONTRACT No. S. 1649		DATE 19.11.42		FOR 1400	
MOTOR CYCLE. "WELBIKE FOLDING" 98 cc MK.I					
Price ex works £26.18.0					
GUARANTEE YEARS DESCRIPTION					
Similar to contract S. 789					
302 m/cycles to be boxed for export by 6-5-43. (see 6t jkt)					
DELIVERY OR COLLECTION DUE to commence Feb 1943 - 400 a month					
W.D. NOS. ALLOTTED C 5152014		To C 5153413			
FRAME NOS 1214 TO 2613					
BODY BY CT. No. & DATE					
DATES RECEIVED 10/3/43 COMPLETE					
EXCELSIOR.					
MAKERS INITIALS + CONTRACT PACKET					
P. 14/3/43					
B C D E F G H I J K L M N O P Q R S T U V W X Y Z					

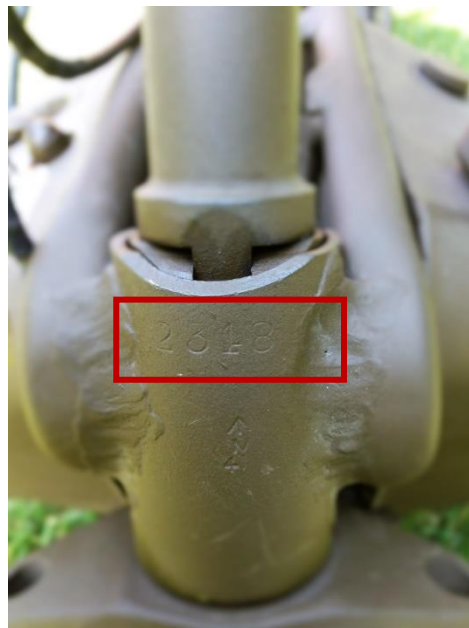
order sheet for contract number S 1649; the second contract placed with Excelsior for supply of Welbikes.

Figure 7 - Second contract order sheet (Vintage Cycle Club)

**Excelsior Welbike:** Mark II  
**Contract Number:** 294/23/S1649 (second of three contracts)  
**War Department Census Number:** C5153148 (last two digits always matched the last two digits of the frame number)  
**Frame serial number:** 2348  
**The Engine Serial Number:** XXE2606



**Figure 8** – Welbike MkII C5153148 contract plate (C Villeneuve)



**Figure 9** – Welbike MkII C5153148 frame number 2348 (C Villeneuve)





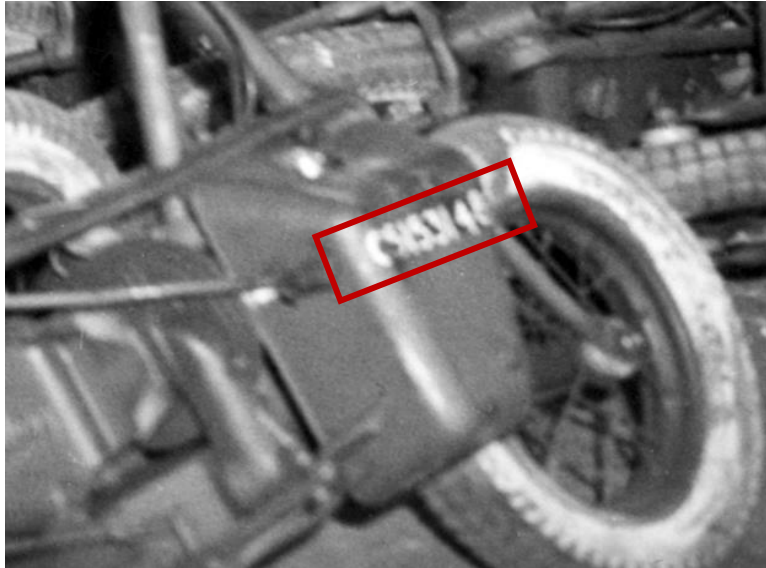
Figure 10 – Welbike MkII C5153148 engine number XXE2606 (C Villeneuve)

The previous owner bought the Welbike from a person living near Melbourne, Australia. The previous Australian owner inherited it from his uncle who purchased it in new condition war surplus after the Second World War. During the restoration, the actual owner was helped by a leading expert from Netherlands who forwarded him a picture of the Disposal Commission auction in Melbourne, Australia on 11 October 1946.



Figure 11 – Disposal Commission auction in Melbourne, Australia on 11 October 1946 (Herald-Sun Melbourne)

Taking a closer look of the bottom right corner of the picture Welbike C5153148 can be seen!



**Figure 12** – Welbike MkII C5153148 at the Disposal Commission auction in Melbourne, Australia on 11 October 1946 (Herald-Sun Melbourne)

Welbike C5153148 comes complete with all its original parts. The only issue with the Welbike, a part from a full tune-up, was that it has been painted “jungle” green by its previous Australian owner. But; as a 1<sup>st</sup> Canadian Parachute Battalion collector there was no other choice...it had to be restored and painted the its proper colour...there was no other compromise!

### Welbike C5153148: The restoration (February – April 2017)



**Figure 13** – Welbike MkII C5153148 before restoration in February 2017 (C Villeneuve)

First, it must be said that the restoration was a work of love even if it was my first time at restoring a vintage military vehicle! Space to work and to paint the Welbike was my first concern. Fortunately, Mr Reg Hodgson, a well-known vehicle restorer and a long-standing member of the Military Vehicle Preservation Association (MPVA) kindly allowed me access to his “motor pool” and provided me with his advice.



Figure 14 – Some good work ahead! (C Villeneuve)

After some research, I realised that the Welbike was in excellent condition and only required a good “tune-up”. After dismantling the Welbike, I had both the petrol tanks “boiled” and the rear break relined. As all work was done locally one can imagine that this “sparked” questions and much amazement by the answers!



Figure 15 – Welbike MkII C5153148 hoping for better times! (C Villeneuve)

All the original parts were present however, after 74 years some needed replacement. The leather pump seal was replaced, the leather saddle cover was cracked so it was replaced by an exact replica, the Dunlop tires were like new, but I decided to replace them by modern ones since I was to ride the Welbike, and finally I had to replace the



spark plug wire. All parts were found at either Welbike UK Ltd (<http://www.welbikeuk.com>) or Villiers (<http://villiersservices.co.uk>).

The paint colour was a good challenge. In accordance with the Military Training Pamphlet (MTP) No 46, Part 4A: Painting of Mechanical Transport issued on 27 November 1941 the Welbike needed to be painted Standard Camouflage Colour (SCC) No 2 Brown (also known as brown, khaki brown or service drab). This was nice but what did the colour actually look like? After some discussion with some fervent Second World War British Airborne Forces enthusiasts and collectors it was determined that it would be much like the Khaki Green No 3 (KG3) paint of the some collective weapons like the Projector, Infantry, Anti-Tank (PIAT). Sadly, the PIAT that I own was painted SCC No 15 Olive Drab<sup>10</sup> however; its Practice Shot Adapter was still KG3. Now the issue was to find the paint. After some fruitless searches with local automobile paint sellers I took the adapter to my local Benjamin Moore dealer who found the right match in less than five minutes! Painting the complete Welbike, using a “Preval Sprayer,” required less than a litre, and it cost me a fraction of the price of automobile paint!

When restoring a vintage British military vehicle one must be aware of the “unique” British specifications associated with British tools and fasteners. For example British cycles and motorcycles for rear axle used British Standard Cycle (BSC) of 3/8<sup>th</sup> inch diameter, fine pitch of 26 threads per inch (tpi) with an angle of thread of 60° degree. As well Second World War British lube specifications can be challenging, at least for a “greenhorn” restorer!

### Welbike C5153148: Now!

Welbike C5153148 is now part of a mobile display on 1<sup>st</sup> Canadian Parachute Battalion (1 Can Para Bn) memorabilia that my wife Annabelle and I enjoy doing from time to time. Dressed as a Major 1 Can Para Bn and Annabelle as an Assistant Section Officer of the Women's Auxiliary Air Force (WAAF) who, after answering the “Call of 18 June 1940 from General de Gaulle” and serving as an officer in charge of a parachute packing section, joined the “F” Section of the SOE, we participate on events such as Canada Day, D Day commemorations, military gatherings, etc.

---

<sup>10</sup> In accordance with Army Council Order (ACI) 533, 12 April 1944 which stated that: “*Olive Drab will be adopted as the basic camouflage colour for all army equipment's, in lieu of Standard Camouflage Colour No. 2 (Brown)*”.



**Figure 16** - Annabelle and Claude Villeneuve in front of their display for the Commemoration of the D Day at Siffleur Falls on 6 June 2017



**Figure 17** - Welbike MkII C5153148 and his proud owner Claude VILLENEUVE (C Villeneuve)

The Welbike C5153148 certainly draws much attention. During the D Day Commemoration at Siffleur Falls (along Highway 11 heading to the beautiful Canadian Rockies) on 6 June 2017 members of the Airborne Social Club (Edmonton) enjoyed Welbike C5153148, and the Veteran Paratroopers Motorcycle Club had their own special way to welcome the new found "little brother": Welbike C5153148 ending up...fully patched!





**Figure 18** - Welbike MkII C5153148 drawing much attention!



**Figure 19** - Welbike MkII C5153148 fully patched!

### Welbike C5153148: The legacy

Welbike C5153148 is one of the very few surviving original and working Welbikes in the world. It is a unique piece of equipment of the Second World War British Airborne Forces. Although its use on the battlefield was limited, its image will remain forever associated with the famous "Red Devils"!

With proper "love" (read maintenance) it should amaze for many years to come, the public, the veterans, and...the kids (whatever age they are)!

## **MANUALS**

### EXCELSIOR

- Book No. 100/EM1 – Driver’s handbook for Excelsior “Welbike” (30 p.)
- Book No. 101/EM1 - Maintenance manual for Excelsior 98 cc. “Welbike” (37 p.)
- Book No. 1649/2/1 – Spare Parts List for Excelsior 98 cc. Two Stroke Solo Motor Cycle “Welbike Model”, Frame Nos: 1214 to 2613, W.D. Nos C5152014 to C5153413 (12 p.)
- Book No. 1649/3/1 – Spare Parts List for Excelsior 98 cc. Two Stroke Solo Motor Cycle “Welbike Model” (MK II), Frame Nos: 2614 to 3954, W.D. Nos C5153414 to C5154754 (12 p.)

### VILLIERS

- Maintenance Handbook & Spare Parts List for The Villiers “Junior-de-Luxe” Engine for Motorised Bicycles, 1946 (16 p.)
- Servicing the Villiers “Junior-de-Luxe” Engine-Clutch Unit with Flat-topped Piston fitted to many types of Motorised Bicycle, 1945, (11 p.)