Introduction to Morse Code

Presented by

VU2RJV

Brigadier S Rajaram

Samuel Fineley Breese **Morse** is given credit as the inventor of the telegraph and the code

Alfred Vail was his Assistant

What we will cover

- Part - I : Morse Code in the Syllabus of ASOC Exam
- Part - II : A brief history of Morse Code
- Part - III : Introduction to Morse Code
- Part - IV : Learning Morse Code

My Amateur Radio History

- First passed passed ASOC Exam when I was 15 years old in 1975 in Class Xth in KV Hebbal, Bengaluru
- Joined the Army in 1976
- Re-wrote the exam in 1990 and got the call sign VU2RJV
- Set up my first station on a sailing boat in 1990 for an expedition to the Persian Gulf
- Set up my shack after retirement from the Army in 2015 with the help of SIARS!!

GENERAL GRADE

क्रम संख्या .....
Serial No. .....

भारत सरकार
GOVERNMENT OF INDIA
संचार एवं सूचना प्रोद्यौगिकी मंत्रालय
MINISTRY OF COMMUNICATIONS & INFORMATION TECHNOLOGY
बेतार आयोजना एवं समन्वय स्कन्ध
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W.P.C. WING
20, Ashoka Road, New Delhi-110001

MINISTRY OF COMMUNICATIONS AND IT * NEW DELHI *

प्रेयानुशीली बेतार तार केन्द्र अनुज्ञाप्ति का नवीकरण

AMATEUR WIRELESS TELEGRAPH STATION

LICENCE RENEWAL OF

(Mr. S. Rajaram)

प्रमाणित किया जाता है कि प्रेयानुशीली बेतार तार केन्द्र अनुज्ञप्ति संख्या ..... काल संकेत .....
..... की अवधि को ..... तक बढ़ा दिया है।

Certified that the validity of the Amateur Wireless Telegraph Station Licence No. VAmt-21828
Call Sign. VU2 RJV has been extended upto 31.08.2025

संख्या :
No.
दिनांक : 07-01-2015
Date

सहायक बेतार सलाहकार भारत सरकार
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MGIPMRND—718TELECOM—07-03-2007.

Part - I

Morse Code in the Syllabus of ASOC Exam

SYLLABUS OF EXAMINATIONS FOR THE AWARD OF AMATEUR STATION OPERATOR'S LICENCE (Restricted) and (General) in India

PART I – Written Test

It shall comprise one paper containing two sections as under:-

- **Section A: Radio Theory and Practice**
- **Note –** Applicants holding degree in Engineering/Science or Diploma in Engineering and having studied electronics or telecommunications shall be exempted from appearing in Section A of Part-I of the test.

SYLLABUS OF EXAMINATIONS FOR THE AWARD OF AMATEUR STATION OPERATOR'S LICENCE (Restricted) and (General) in India

- **Section B**: National and International Telecommunication Union (ITU) Radio Regulations applicable to the operation of amateur station and those relating to the working of station generally.

PART II – Morse (Only for General Certificate)

- **Morse reception and sending (8 wpm)**

Morse Receiving: (Speed: 8 words per minute)

- The test piece will consist of a plain language passage of 200 characters which may comprise of letters, figures. Test piece may also contain the following punctuations i.e. full stop; comma; semi colon; break-sign; hyphen and question mark.
- The test will be for five consecutive minutes at a speed of 8 words per minute.

Part II-Morse

Morse receiving: (Speed: 8 words per minute)

- A short practice piece of one minute shall be sent at the prescribed speed before the start of the actual test. Candidates will not be allowed more than one attempt in Morse reception and sending test, the test may be written in ink or pencil but must be legible.

Morse receiving: (Speed: 8 words per minute)

The test piece will be similar to Morse Receiving test for Amateur Station Operators' License (General) examination. Candidates are required to send for five consecutive minutes at a speed not less than 8 words per minute. Other conditions are the same as applicable to Amateur Station Operators' License (General) examination.

Note- A candidate shall have to pass both receiving and sending simultaneously.

Part - II

History of Morse Code

History of Morse Code

Morse code is a method used in telecommunication to encode text characters as standardized sequences of two different signal durations, called *dots* and *dashes* or *dits* and *dahs*

The International Morse Code encodes the 26 English letters A through Z, some non-English letters, the Arabic numerals and a small set of punctuation and procedural signals (prosigns)

There is no distinction between upper and lower case letters

1837 : Fore-runner to the International Morse code

- The American artist Samuel F. B. Morse, the American physicist Joseph Henry, and Alfred Vail developed an electrical telegraph system.
- It needed a method to transmit natural language using only electrical pulses and the silence between them.
- Around 1837, Morse, therefore, developed an early forerunner to the modern International Morse code

1840 : Alfred Vail

- In his earliest code, Morse had planned to transmit only numerals and to use a codebook to look up each word according to the number which had been sent.
- However, the code was soon expanded by Alfred Vail in 1840 to include letters and special characters so it could be used more generally.
- The shorter marks were called "dots" and the longer ones "dashes", and the letters most commonly used were assigned the shorter sequences of dots and dashes. This code, first used in 1844, became known as *Morse landline code* or *American Morse code*.

1848 : Friedrich Clemens Gerke

- The Morse code, as it is used internationally today, was derived from a much-refined proposal by Friedrich Clemens Gerke in 1848 that became known as the "Hamburg alphabet".

- Gerke changed many of the codepoints, in the process doing away with the different length dashes and different inter-element spaces of American Morse, leaving only two coding elements, the dot and the dash.

- This finally led to the International Morse code in 1865

1890s Onwards : Morse Code Primary Radio Communication

- In the 1890s, Morse code began to be used extensively for early radio communication before it was possible to transmit voice.
- In the late 19th and early 20th centuries, most high-speed international communication used Morse code on telegraph lines, undersea cables and radio circuits.
- In aviation, Morse code in radio systems started to be used on a regular basis in the 1920s.
- Although previous transmitters were bulky and the spark gap system of transmission was difficult to use, there had been some earlier attempts.
- In 1910, the US Navy experimented with sending Morse from an airplane

History of Morse Code

- With the advent of radio communications, the international Morse became more widespread.
- Users of the international Morse created dahs with a longer key closure, instead of two close-spaced dits.
- In order to increase transmission speed on early landline circuits and later on radio circuits, semi-automatic "bug" keys were invented in 1902 and were widely adopted.
- Bug keys used a vibrating pendulum to create dits and the user still manually creates the dahs.

History of Morse Code

In more recent times, the user can employ keyers that electronically create dits and dahs. Iambic keyers have a memory so that the user can operate a mechanical "paddle" quicker than the keying rate of the keyer. This makes for very comfortable and nearly effortless keying.

Today experienced operators copy received text without the need to write as they receive, and when transmitting, can easily converse at 20 to 30 words per minute. Morse code will always remain a viable means of providing highly reliable communications during difficult communications conditions.

A commercially manufactured **iambic paddle** used in conjunction with an electronic keyer to generate high-speed Morse code

The timing is controlled by the electronic keyer. Manipulation of dual-lever paddles by pressing the right paddle generates a series of *dahs*, and squeezing the paddles produces dit-dah-dit-dah sequence. The actions are reversed for left-handed operators.

Before Mars
National Geographic TV series Prequel

Part - III

Introduction to Morse Code

Morse Code Symbols

- Each Morse code symbol is formed by a sequence of **dots** and **dashes**
- The ***dot duration*** is the basic unit of time measurement in Morse code transmission
- The duration of a **dash is three times** the duration of a dot

Introduction to Morse Code

- Each dot or dash within a character is followed by period of signal absence, called a *space*, equal to the dot duration.
- The letters of a word are separated by a space of duration equal to three dots, and
- The words are separated by a space equal to seven dots.[1] To increase the efficiency of encoding,

Introduction to Morse Code

- Morse code was designed so that the length of each symbol is approximately inverse to the frequency of occurrence of the character that it represents in text of the English language.

- Thus the most common letter in English, the letter "E", has the shortest code: a single dot.

International Morse Code

1. The length of a dot is one unit.
2. A dash is three units.
3. The space between parts of the same letter is one unit.
4. The space between letters is three units.
5. The space between words is seven units.

The ‘Dit’ and the ‘Dah’

- To reflect the sounds of Morse code receivers, the operators began to vocalize a dot as "dit", and a dash as "dah".
- Dots which are not the final element of a character became vocalized as "di".
- For example, the letter "c" was then vocalized as "dah-di-dah-dit"

SOS

In an emergency, Morse code can be generated by improvised methods such as turning a light on and off, tapping on an object or sounding a horn or whistle, making it one of the simplest and most versatile methods of telecommunication. The most common distress signal is SOS – three dots, three dashes, and three dots – internationally recognized by treaty.

A U.S. Navy signalman sends Morse code signals in 2005.U.S. Navy signalman sends Morse code signals in 2005.

Introduction to Morse Code

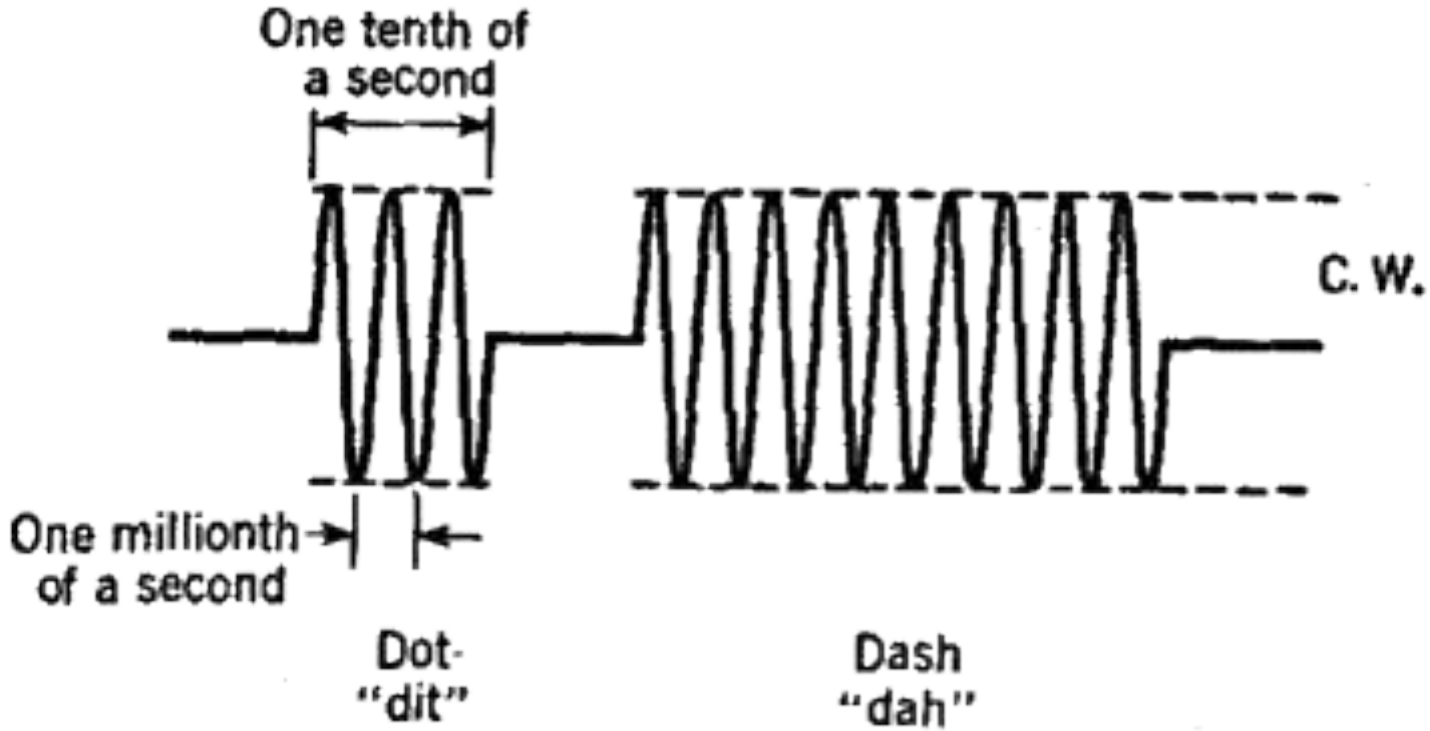
- Because the Morse code elements are specified by proportion rather than specific time durations, the code is usually transmitted at the highest rate that the receiver is capable of decoding.

- The Morse code transmission rate (*speed*) is specified in *groups per minute*, commonly referred to as *words per minute*.[4]

Introduction to Morse Code

Morse code is usually transmitted by on-off keying of an information-carrying medium such as electric current, radio waves, visible light, or sound waves

The current or wave is present during the time period of the dot or dash and absent during the time between dots and dashes


One tenth of
a second
C. W.
One millionth
of a second
Dot-
"dit"
Dash
"dah"

Part - IV

Learning Morse Code

- Why Morse Code?
  - Effective
  - Efficient
  - Universal
  - Simple!

- Why else use Morse Code?
  - **More Frequencies**
  - **Low profile** or **Stealth operation**
  - Backpacking and Hiking
  - It’s **FUN**
  - **Hearing Impairments**
  - You will be **special!**

- Learning the code
  - The Right way
    - Learning by sound from the start
  - The Wrong way
    - Learning visually by memorizing a code table

- Learning the code
  - **BIG MISTAKE** – memorizing a code table

Character	Morse Code	Character	Morse Code	Number	Morse Code
A	•–	N	–•	1	•–––––
B	–•••	O	–––	2	••–––
C	–•–•	P	•––•	3	•••–––
D	–••	Q	––•–	4	••••–
E	•	R	•–•	5	•••••
F	••–•	S	•••	6	–••••
G	––•	T	–	7	––•••
H	••••	U	••–	8	–––••
I	••	V	•••–	9	––––•
J	•–––	W	•––	0	–––––
K	–•–	X	–••–		
L	•–••	Y	–•––		
M	––	Z	––••		

Learning Morse Code

- Best Way to Learn – Aurally (dits & dahs)
  - Learn it by SOUND

- **NEVER** Dots and Dashes and visually

- Practice both sending and receiving at the same time.

Learning Morse Code

Morse code can be learned comfortably, and Morse code signalling in a form perceptible to the human senses, such as sound waves or visible light, can be directly interpreted by persons trained in the skill

Because many non-English natural languages use other than the 26 Roman letters, Morse alphabets have been developed for those languages

Lesson -1

E - Dit

T - Dah

K - Dah-Di-Dah

1 - Di-dah-dah-dah-dah

Technique of Learning

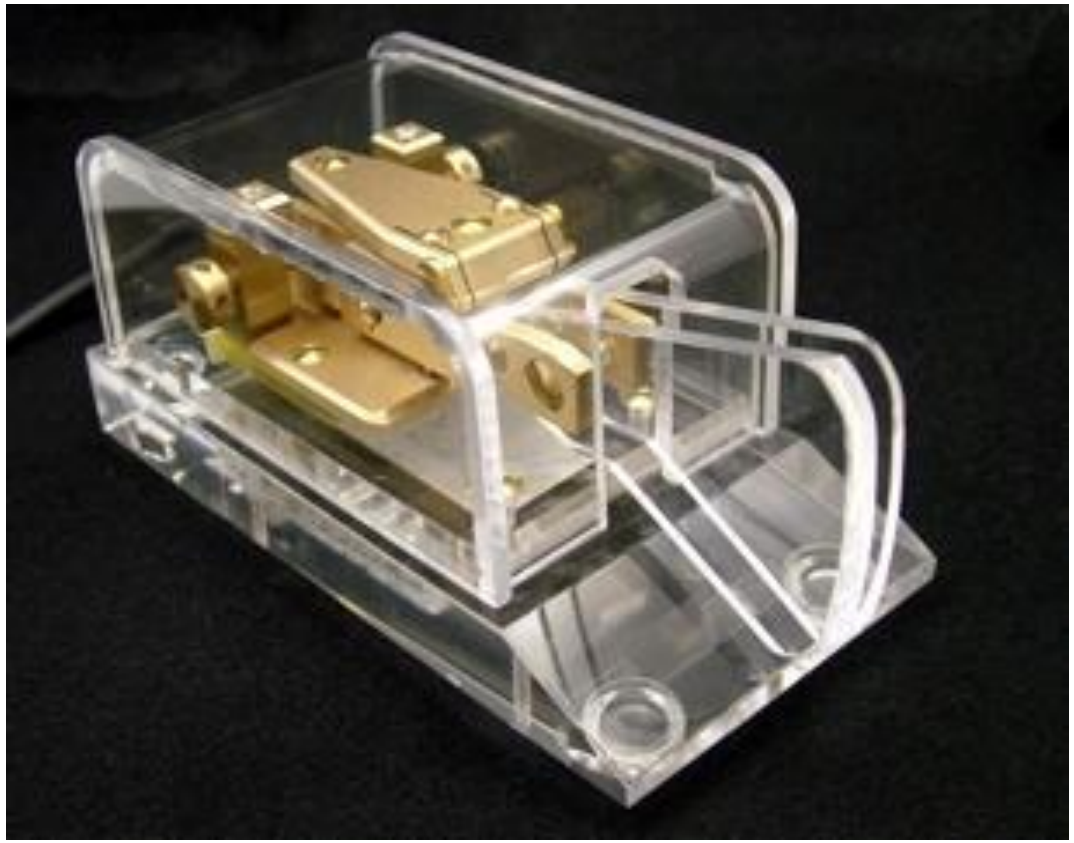
We'll start learning characters at a higher speed e.g., 12 Words Per MInute (WPM) so that you get used to recognising characters at a higher speed

We'll give more time between characters so that your brain can process the sound and associate it with the character. It will be easier to increase speed later on.

Illustration - learning a language is always done at the same speed that you'll finally speak in and not slower.

Sending Morse Code – Straight Key

- **Double Lever Paddles**



Questions

Please type your Questions in the Chat Box

History of Morse Code : Samuel Morse

Samuel F. B. Morse (1791-1872) was a painter and founder of the National Academy of Design. In 1832, while on a ship returning from Europe, he conceived the basic idea of an electromagnetic telegraph. Experiments with various kinds of electrical instruments and codes resulted in a demonstration of a working telegraph set in 1836, and introduction of the circuit relay. This made transmission possible for any distance. With his creation of the American Morse code, the historic message*, "What hath God wrought*?" was successfully sent from Washington to Baltimore.

History of Morse Code

The Morse code used in those days differed greatly from that which is used today. Morse code originated on telegraph lines and the original users did not listen to tones but instead to the clicking sounds created by sounders. They used the American Morse code as opposed to today's International Morse. When sending dahs (Morse code is composed of dits or short key closures, and dahs or longer key closures) the user simply sent two close-together dits. This was created by using a conventional code key.