

# Electronic Voting Machines (EVMs)

February 7, 2019

## UPDATE

### Manifest Pedagogy

Electoral reforms and election of lok sabha is hot topic for this year prelims and mains. There is high probability in the upcoming prelims. So it is important to study this topic holistically and all at once. Hence this article is not a separate one but an addendum to the earlier article on EVM making it easier for students to integrate

### About VVPAT and how it functions

- The Voter Verifiable Paper Audit Trail device is an add-on connected to the Electronic Voting Machine.
- It allows voters to verify if their vote has indeed gone to the intended candidate by leaving a paper trail of the vote cast.
- After the voter casts his or her mandate by pressing a button related on the ballot machine (next to the symbol of the chosen party), the VVPAT connected to it prints a slip containing the poll symbol and the name of the candidate. The slip is visible to the voter from a glass case in the VVPAT for a total of seven seconds and the voter can verify if the mandate that s/he has cast has been registered correctly. After this time, it is cut and dropped into the drop box in the VVPAT and a beep is heard, indicating the vote has been recorded.

### Importance of VVPAT

- Prior to voting, the VVPAT unit is calibrated to ensure

that the button pressed on the ballot unit of the EVM is reflected correctly on the printed slips by the VVPAT.

- The presence of the slips that correspond to voter choice on the EVM helps retain a paper trail for the votes and makes it possible for the returning officer to corroborate machine readings of the vote. The VVPAT machines can be accessed only by polling officers.
- The units are sealed and can be opened during counting by the returning officer if there's a contingency. Thus VVPAT is helpful in tallying the accuracy of EVM.

### **Problems faced by VVPAT**

- **Manufacturing glitches:** In the initial phase of VVPAT implementation in the Lok Sabha by-elections in States such as Uttar Pradesh, Bihar and Maharashtra and the Assembly election in Karnataka, there was a high rate of failure of VVPAT machines due to manufacturing glitches.
  - **High failure rates and not a all wheather machine:** In the Lok Sabha by-elections in 2017, the rate of VVPAT replacement, owing to glitches, was more than 15%, higher than the acceptable rates of failure (1-2%). These glitches also caused severe **disruptions to polling**. To account for failure rates, the EC has tried to provide back-up machines to allow for swift replacement. The EC admitted later that the machines had high failure rates owing to hardware issues that occurred during the transport of EVMs and their exposure to extreme weather conditions.
- 

## **Manifest Pedagogy**

Electoral reforms as a topic has been in news for the past 3 years. EVM as a topic was also asked in Mains exam this year. It is relevant topic since it is mentioned in the syllabus as well through the topic- Representation of Peoples Act. Hence

static and current linkages on this topic is must.

## **In news**

EVMs and controversies surrounding them

## **Placing it in syllabus**

Indian Polity – Representation of People's Act

## **Static dimensions**

1. Electoral reforms history
2. EVMs and their history

## **Current dimensions**

1. Electoral reforms under the new government
2. Controversies surrounding EVMs and solutions

## **Content**

### **What are EVMs?**

An EVM is simple, reliable, tamper-proof, error-free equipment that allows a voter to choose one from among several candidates. The EVM is designed to collect, record, store, count and display polling data with cent per cent accuracy.

An EVM is designed with two units: the control unit and the balloting unit. These units are joined together by a cable. The control unit of the EVM is kept with the presiding officer or the polling officer. The balloting unit is kept within the voting compartment for electors to cast their votes. This is done to ensure that the polling officer verifies your identity.

EVMs are;

- Standalone Machines

- No Radio Frequency transmission or reception possible – no wireless communication possible
- One Time Programmable (OTP) chip
- Dynamic coding of key press
- Real time clock for time and date stamping key press

### **Who devised them?**

The EVM has been designed by the Election Commission in collaboration with two public sector undertakings – Bharat Electronics Ltd, Bangalore, and Electronics Corporation of India Ltd, Hyderabad after a series of meetings, prototypes, and extensive field trials. The EVMs are now manufactured by these two undertakings.

### **History / Background of EVMs**

- With a view to overcome certain problems associated with use of ballot papers and taking advantage of development of technology so that voters cast their votes correctly without any resultant ambiguity and removing the possibilities of invalid votes totally, the Commission in December, 1977 mooted the idea of EVM. The law was amended by the Parliament in December, 1988 and a new section 61A was inserted in the Representation of the People Act, 1951 empowering the Commission to use voting machines. The amended provision came into force w.e.f. 15th March, 1989.
- As an engineer, Sujatha Rangarajan supervised the design and production of the electronic voting machine (EVM) during his tenure at Bharat Electronics Limited, a machine which is currently used in elections throughout India, gazetted “Electronically operated vote the counting machine”. His original design was exhibited to the public in Government Exhibitions held in six cities. The EVMs were commissioned in 1989 by Election Commission of India collaboration with Bharat Electronics Limited and Electronics Corporations of

India Limited. The Industrial designers of the EVMs were faculty members at the Industrial Design Centre, IIT Bombay.

- The EVM were **first used** in India almost two decades ago in the **North Paravur assembly by-election in Kerala**.
- EVMs manufactured in 1989-1990 were used on an **experimental basis** in 16 assembly constituencies in the states of Madhya Pradesh (5) and Rajasthan (5) and the National Capital Territory of Delhi (6) during the elections to the respective legislative assemblies in November 1998.
- The incorporation of machines, technology and automation for electoral voting goes back to at least 1892, when the first **“lever voting machine”** was used in New York, after decades of relying on paper ballots. **Punch-card voting machines** were introduced in the US in the 1960s, and were still in use in Florida four decades later, when their malfunctioning helped make the 2000 presidential election controversial. The US also saw the first EVMs introduced in 1975.

## **Advantages**

1. EVMs **ensure the principle of ‘one person, one vote’**: As a citizen presses a voting button on the Ballot Unit, the vote is recorded and the machine gets locked. Even if one presses that or any other button again, no vote will be recorded.
2. **Difficult to rewrite**: No one can rewrite a program without damaging the sealed microchip in EVM. So EVM programming cannot be changed to facilitate a particular candidate or part, EVMs can be taken away and damaged while capturing booths.
3. For glitches, an officer, in charge of 10 polling stations, carries spare EVMs to replace out-of order machines.
4. This is a state-of-the-art election process, **simple to**

**install and operate.**

5. There is **no scope for invalid votes** and assures total secrecy of polling data.
6. It facilitates **quick and accurate counting**, making it possible to declare the results the same evening.
7. The machine can be reused by simply resetting it. It puts an end to the huge expenditure on printing, storing, and transporting ballot papers.
8. It is also **environment-friendly** because it eliminates paperwork.

### **Disadvantages and controversies surround them**

1. In a collaborative study, a team of Indian and international experts have revealed that the electronic voting machines used in Indian elections are **vulnerable to fraud**. Even brief access to the machines, known in India as EVMs, could allow criminals to alter election results.
2. There are around 1.4 million of the machines in use, all of the **controversial "Direct Recording Electronic" (DRE) variety**. Such machines **record the votes only to internal memory** and provide no paper records for later inspection or recount. With DREs, absolute trust is placed in the hardware and software of the voting machines.
3. The researchers were also surprised to find that the vote-counting software in the EVMs is programmed into so-called **"mask programmed microcontrollers,"** which do not allow the software to be read out and verified. Because these chips are made in the US and Japan, this has led to a situation in which nobody in India knows for sure what software is in these machines or whether it counts votes accurately.
4. The paperless class of voting systems has **intrinsic security problems**.
5. All machines invented by human beings are designed to be manipulated. There is always an input window and an

output window through which we interact with a machine. The computer and internet era have made it possible for any one to manipulate a piece of electronic gadgetry sitting in any corner of the globe without revealing his or her identity.

6. Any one who challenges the security of an EVM starts from an inherent disadvantage. **He or she will not have easy access to EVMs**, their source code or will not be allowed to test their method in a real election.
7. It is often argued that **only those who lose the election raise the issue, when the same people win they remain silent.**

### **What needs to be done**

Using of Voter- Verified Paper Audit Trail(VVPAT) along with EVMs, though VVPAT is not foolproof but it gives both the voters and political parties an assurance. If the inherent lacunae are solved, VVPAT can be an effective alternative.